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NAVFAC
Naval Facilities Engineering Command
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FINAL
5 NOVEMBER 2008

Closure Report

Interim Repair Action
OU A Charleston Beach

Bremerton Naval Complex
Bremerton, Washington

Department of the Navy
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
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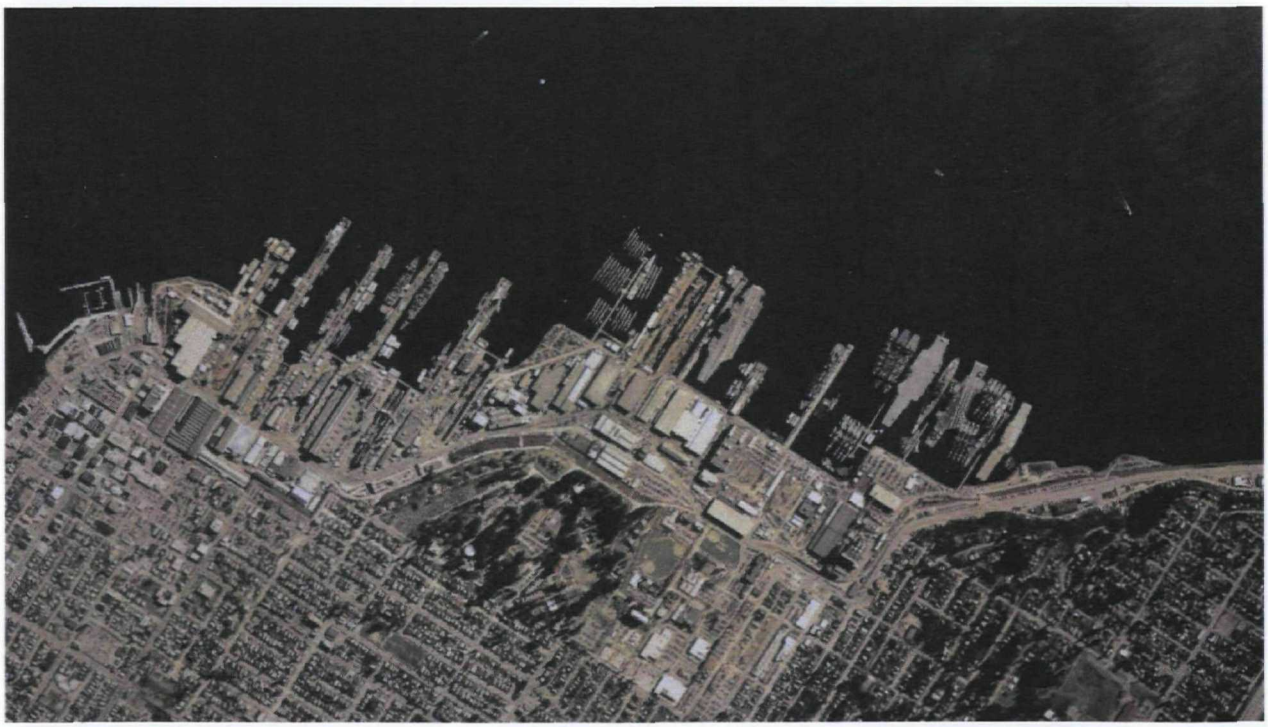

CONTRACT NO. N68711-04-D-1104
TASK ORDER NO. 0031

FINAL
CLOSURE REPORT

INTERIM REPAIR ACTION
BREMERTON NAVAL COMPLEX
OU A CHARLESTON BEACH

SES-TECH

NOVEMBER 5, 2008

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EXECUTIVE SUMMARY

Between 14 August 2008 and 28 August 2008, Sealaska Environmental Services, LLC-Tetra Tech EC, Inc. Joint Venture (SES-TECH) performed an interim repair action to stabilize the bluff and enhance the beach habitat at Charleston Beach, located at Operable Unit (OU) A within the Bremerton Naval Complex (BNC), Bremerton, Washington. This repair action was performed as an interim repair while the Stakeholders (U.S. Navy [Navy], the Suquamish Tribe, U.S. Environmental Protection Agency, Washington Department of Fish and Wildlife [WDFW], and Washington Sate Department of Ecology [Ecology]) develop a long term solution to control the erosion and protect the marine habitat at Charleston Beach in accordance with the OU A ROD.

Between December 2001 and April 2002, a mitigation action was conducted to increase the upper intertidal habitat at Charleston Beach. This mitigation action served as an offset for the Military Construction (MCON) Project P-341, which provided for the replacement of Pier D. Part of this mitigation included removing the riprap armor wall that comprised part of the OU A ROD remedy and replacing it with a soft bank sloped beach covered with fish mix gravel. Ecology deemed that this soft beach was protective per the ROD for OU A as long as "scouring is not excessive." As a result of the mitigation action:

- An additional 12,700 square feet of intertidal habitat was constructed along 300 feet of shoreline between +7 and +14 feet mean lower low water (MLLW).
- A minimum 3-foot layer of fish mix was placed to provide habitat for juvenile salmon.
- Vegetation consisting of native herbs, shrubs, trees, and woody debris was placed above elevation +14 feet MLLW.
- Along the riparian portion of the shoreline, topsoil was placed above +14 feet MLLW and the area was re-vegetated with native species.

To ensure the ROD remedy remained protective of human health and the environment, semi-annual inspections of the shoreline and erosion beach gauges were performed between 2002 and November 2007. The results indicated that scouring was excessive resulting in the erosion of the fish mix and embankment. Between completion of the mitigation action in April 2002 and September 2007, the embankment has eroded northward up to 14 feet into the landfill, which allowed the release of fill material onto the beach. The fish mix along the west end of the beach completely eroded away such that fill material previously underlying the fish mix cover was exposed.

To mitigate this erosion, the Navy had intended to perform an emergency repair action in November and December 2007, prior to the 2008 storm season. This action was documented in the Action Memorandum signed 5 September 2007 (Navy 2007a). The emergency repair action involved construction of a permanent armor rock revetment to contain the fill material. Mobilization activities began on 26 November 2007. In accordance with the Washington Administrative Code (WAC) 220-110, the Navy contacted the WDFW to determine if an inspection of the beach area to be impacted by the construction activities was necessary for evaluation of surf smelt spawning activity. A WDFW biologist performed an inspection of the beach at the start of construction activities on 27 November 2007 and found surf smelt eggs. In consultation with the Stakeholders, it was mutually agreed to halt construction and postpone the repair action until August 2008 when surf smelt spawning has its lowest viability. It was also agreed that the repair action would be performed only as an interim repair action to stabilize the bluff and enhance the beach habitat while the Stakeholders develop a long term solution to control the erosion and protect the marine habitat in accordance with the OU A ROD.

After consensus of the interim repair action to be performed was reached with the Stakeholders on 30 June 2008, mobilization activities commenced on 14 August 2008. Construction activities were completed on 28 August 2008.

A total of 157.72 tons of armor rock and 829.42 tons of fish mix were placed to stabilize the bluff and enhance the beach habitat at Charleston Beach while the Stakeholders develop a long term solution to control the erosion and protect the marine habitat at Charleston Beach in accordance with the OU A ROD. The armor rock was placed in front of 120 lineal feet of eroding embankment and the fish mix was placed between +7 feet MLLW and +14.7 feet MLLW to provide erosion protection over the exposed fill and to provide habitat for juvenile salmon and surf smelt. A fish mix bench was also installed above +11.74 feet MLLW to maximize stability of the shoreline.

As a result of the erosion that has occurred, approximately an additional 1,600 square feet of intertidal habitat (between +7 and +14 feet MLLW) along 120 lineal feet of shoreline has been created between STA 3+00 and STA 4+20. Between STA 4+20 and STA 6+00, approximately an additional 500 square feet of intertidal habitat has been created.

Until a long term solution to restore erosion protection for the full extent of OU A is implemented, the fish mix erosion protection will be monitored to ensure continued protection of human health and the environment.

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CONTENTS (Continued)

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AM	Action Memorandum
ARAR	applicable or relevant and appropriate requirements
BA	Biological Assessment
BMP	Best Management Practices
BNC	Bremerton Naval Complex
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHMI	Contractor Hazardous Material Inventory
CIH	Certified Industrial Hygienist
COC	contaminant of concern
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DCN	Design Change Notice
Ecology	Washington State Department of Ecology
ECTI	Enviro Con Trucking, Inc.
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FCR	Field Change Request
FS	Feasibility Study
FWENC	Foster Wheeler Environmental Corporation
HPA	Hydraulic Project Approval
MCON	Military Construction
MLLW	mean lower low water
MOA	Memorandum of Agreement
NAVFAC NW	Naval Facilities Engineering Command Northwest
Navy	U.S. Navy
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List

ACRONYMS AND ABBREVIATIONS (Continued)

OU	Operable Unit
OVTS	Olympic View Transfer Station
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RHA	Rivers and Harbors Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SES-TECH	Sealaska Environmental Services, LLC-Tetra Tech EC, Inc. Joint Venture
SMA	Shoreline Management Act
SQS	Sediment Quality Standards
TBC	to be considered
TO	Task Order
URS	URS Consultants
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WIS	Waste Information Sheet
WISHA	Washington Industrial Safety and Health Administration

1. PROJECT BACKGROUND

Between 14 August 2008 and 28 August 2008, Sealaska Environmental Services, LLC-Tetra Tech EC, Inc. Joint Venture (SES-TECH) performed an interim repair action to stabilize the bluff and enhance the beach habitat at Charleston Beach, located at Operable Unit (OU) A within the Bremerton Naval Complex (BNC), Bremerton, Washington. Naval Facilities Engineering Command Northwest (NAVFAC NW) selected SES-TECH to perform the repair action under Contract No. N68711-04-D-1104, Task Order (TO) No. 0031.

1.1 SITE BACKGROUND

The BNC is located just south of the City of Bremerton, Washington along the Sinclair Inlet shoreline. OU A is situated at the southwestern end of the BNC, west of Mooring G. It encompasses an area of approximately 12 acres created by the placement of fill material. Sinclair Inlet borders it to the south and State Highway 304 to the north (Figure 1-1).

The initial fill at OU A was placed in the 1940s. The site was brought to its present configuration by the placement of additional fill in 1956 and 1971. Between 1963 and 1972, unlined pits in the general area were used to dispose of liquid wastes. Beginning in the mid-1950s, copper slag (grit) and sandblasting materials also were deposited in the area. Some of this material was reportedly disposed of at OU A. Other potential contaminant sources include dredge spoils, burn pits, and helicopter fueling operations.

A Remedial Investigation (RI) and Feasibility Study (FS) were completed for OU A in August and October 1995 (URS Consultants [URS] 1995a, b). The Final Record of Decision (ROD) was signed 16 December 1996 (URS 1996). During the RI/FS, OU A was divided into three zones: Charleston Beach Parking Lot (Zone I), Missouri Parking Lot (Zone II), and the Upland Parking Lot, between the railroad tracks and State Highway 304 (Zone III) (Figure 1-2). The RI revealed that the primary area of contamination was Zone II. Contaminants of concern (COCs) identified by the RI/FS and summarized in the ROD include heavy metals, pesticides/polychlorinated biphenyls, semivolatile organic compounds, volatile organic compounds, and total petroleum hydrocarbons. No hazardous waste disposal activities were identified at Zone I, the Charleston Beach parking lot, or Zone III, the upland parking lot between the railroad tracks and State Highway 304. The remedy prescribed by the ROD left Zones I and III intact as the existing conditions were deemed to be of sufficient protection.

The ROD for OU A included actions to control erosion, upgrade site paving, enhance marine and terrestrial habitats, develop and implement institutional controls, and conduct a groundwater and remedial action monitoring program with a review of remedial measures every five years. The OU A remediation was implemented by constructing a shoreline protection system and paving the Missouri Parking lot. Construction began in January 1998 and was completed in August 1998.

Between December 2001 and April 2002, a mitigation action was conducted to increase the upper inter-tidal habitat at Charleston Beach (Zone 1). This mitigation action served as an offset for the Military Construction (MCON) Project P-341, which provided for the replacement of Pier D. Part of this mitigation included removing the riprap armor wall that comprised part of the OU A ROD remedy and replacing it with a soft bank sloped beach covered with fish mix gravel. Washington State Department of Ecology (Ecology) deemed that this soft beach was protective per the ROD for OU A as long as "scouring is not excessive." A copy of the mitigation action design drawings is provided in Appendix A (Foster Wheeler Environmental Corporation [FWENC] 2002). Figure 1-3 depicts Charleston Beach after completion of the mitigation action. As a result of the mitigation action:

- An additional 12,700 square feet of inter-tidal habitat was constructed along 300 feet of shoreline between +7 and +14 feet mean lower low water (MLLW).
- A minimum 3-foot layer of fish mix was placed to provide habitat for juvenile salmon.
- Vegetation consisting of native herbs, shrubs, trees, and woody debris was placed above elevation +14 feet MLLW.
- Along the riparian portion of the shoreline, topsoil was placed above +14 feet MLLW and the area was re-vegetated with native species.

To ensure the ROD remedy remained protective of human health and the environment, semi-annual inspections of the shoreline and erosion beach gauges were performed. A summary of the results of the inspections is provided below. The results indicated that scouring was excessive resulting in the erosion of the fish mix and embankment.

- Monitoring of the site in June 2003 indicated that the fish mix placed in 2002 has eroded 4 inches at the beach gauge and 12 inches at the gauge adjacent to the riprap wall. There was no indication of erosion at the embankment gauge (FWENC 2003). The erosion gauge located at the eastern end of the site was no longer visible. It was

presumed that the eroded material from the west end of the beach has migrated and deposited over the gauge at the east end of the beach. Locations of the gauges are shown in Figures 1-3 and 1-4.

- Monitoring of the site in February 2006 indicated that the fish mix had eroded 17 inches and the topsoil / fill material at the embankment gauge had eroded 36 inches (SES-TECH 2006).
- Monitoring of the site in June 2006 indicated that the fish mix had eroded an additional 0.5 inches at the gauge adjacent to the riprap and an additional 0.75 inches had eroded at the beach gauge (SES-TECH 2006).
- In April 2007, inspection indicated that an additional 5 inches of topsoil / fill material had eroded at the embankment gauge. An additional 2.5 inches of fish mix had eroded at the gauge adjacent to the riprap wall, and an additional 3.25 inches had eroded at the beach gauge (SES-TECH 2007a).
- Visual observation in April and July 2007 indicated that between STA 3+00 and STA 4+20, the soft beach (Figures 1-4 and 1-5) has scoured to the extent that the fish mix was mostly gone and the soft embankment that makes up the edge of OU A along Charleston Beach had eroded back into the fill, thus initiating release of fill debris onto the beach. Photographs of the site visit from July 2007 are provided in Appendix B.
- Profile surveys (Figure 1-6) conducted by SES-TECH on 10 September 2007 indicated that at the western end of the beach, adjacent to the riprap wall, majority of the fish mix has eroded away (SES-TECH 2007b). Close to STA 4+20, the fish mix had eroded, but not as extensively as seen at the west end. At this location, an approximate 1- to 1.5-foot thick layer of fish mix remained. The embankment had eroded horizontally northward, into the landfill, an average of 10 feet at STA 4+00 and 14 feet at STA 3+60 (see Appendix C). Visual observations of the beach indicate that most of the higher sandy fish mix material had eroded from its original condition in 2002 and the gravel material had been sorted within the beach area.
- Inspections conducted on 26 and 27 November 2007, indicated that the topsoil / fill material at the embankment gauge had eroded an additional 1.5 inches for a total of 42.5 inches. In addition, the gauge adjacent to the riprap wall indicated that an additional 1 inch of fish mix had eroded, and the fish mix at the beach gauge had eroded an additional 4 inches, for a total erosion of 21 and 25 inches, respectively. The eastern erosion gauge is still not visible (SES-TECH 2008a).

As a result of the erosion, the Navy had intended to perform an emergency repair action in November and December 2007, prior to the 2008 storm season. This action was documented in the Action Memorandum (AM) signed 5 September 2007 (U.S. Navy [Navy] 2007a). The emergency repair action involved construction of a permanent armor rock revetment to contain the fill material. Mobilization activities began on 26 November 2007. In accordance with the Washington Administrative Code (WAC) 220-110, the Navy contacted the Washington Department of Fish and Wildlife (WDFW) to determine if an inspection of the beach area to be impacted by the construction activities was necessary for evaluation of surf smelt spawning activity. A WDFW biologist performed an inspection of the beach at the start of construction activities on 27 November 2007 and found surf smelt eggs. In consultation with the Stakeholders, it was mutually agreed to halt construction and postpone the repair action until August 2008 when surf smelt spawning has its lowest viability. It was also agreed that the repair action would be performed only as an interim repair action to stabilize the bluff and enhance the beach habitat while the Stakeholders develop a long term solution to control the erosion and protect the marine habitat in accordance with the OU A ROD.

Between 27 November 2007 and 18 August 2008, plastic sheeting was placed over the shoreline and upland area, and silt fence was installed in front of the base of the bluff to minimize erosion until commencement of the interim repair action. Bi-weekly inspection and maintenance of the plastic sheeting and silt fence were performed to ensure the temporary measures were performing as intended through the rainy season (31 March 2008), and then reduced to once per week until commencement of the interim repair action on 18 August 2008. Inspections were also performed after significant rain events (0.5 inches of rain within a 24-hour period).

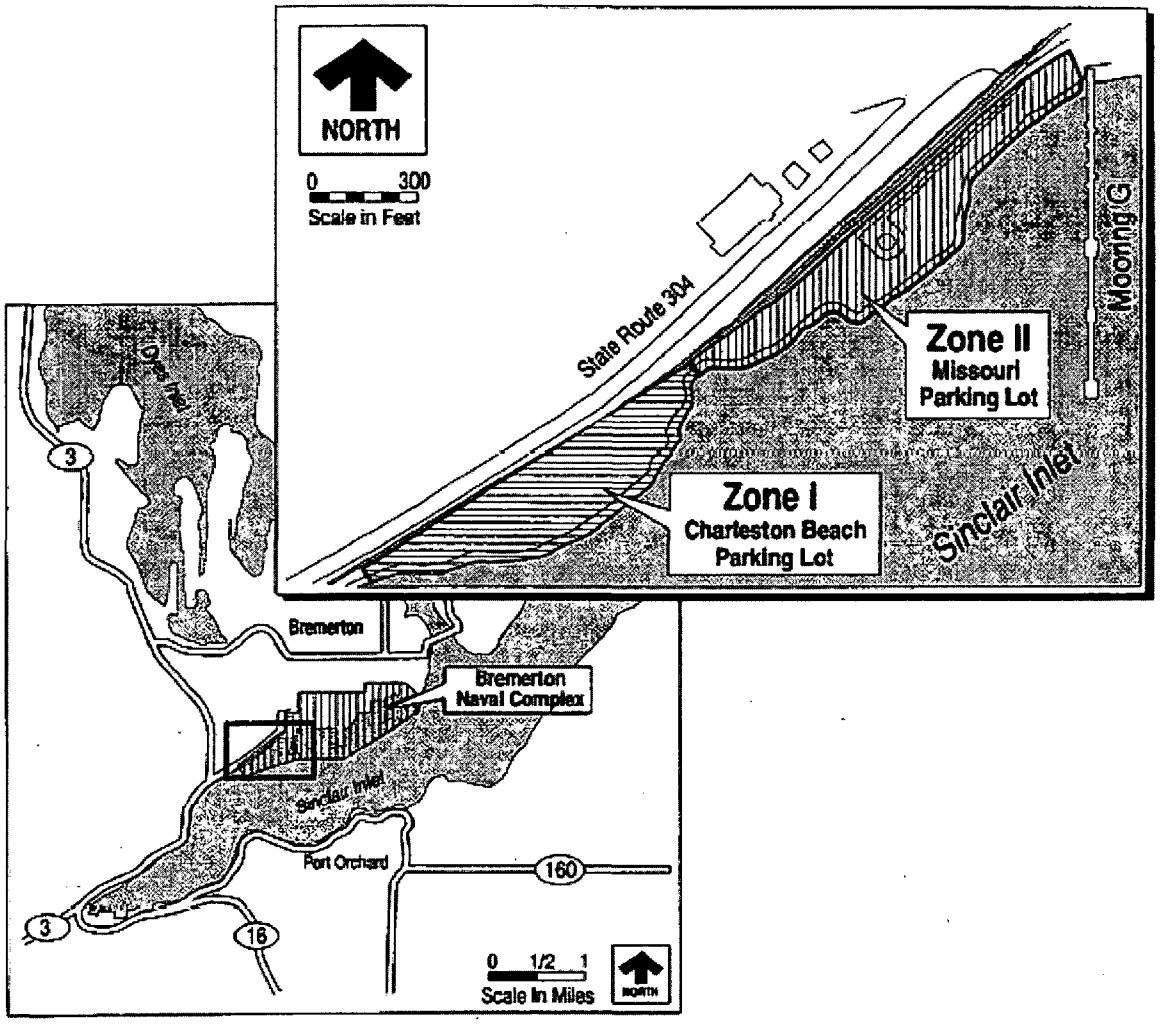

Figure 1-1. Vicinity Map

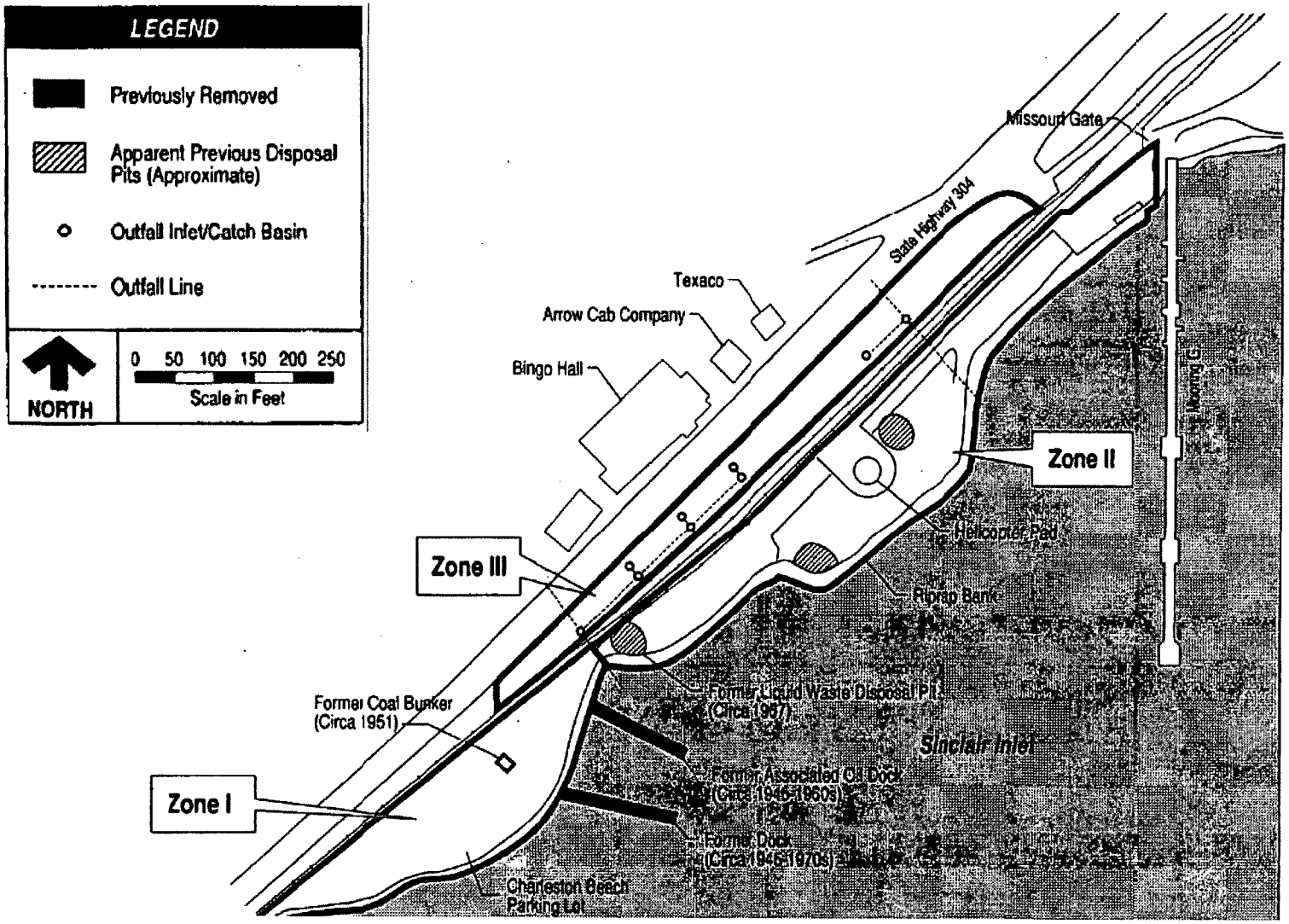

Figure 1-2. Approximate Locations of Investigatory Zones and Previous Industrial Activities

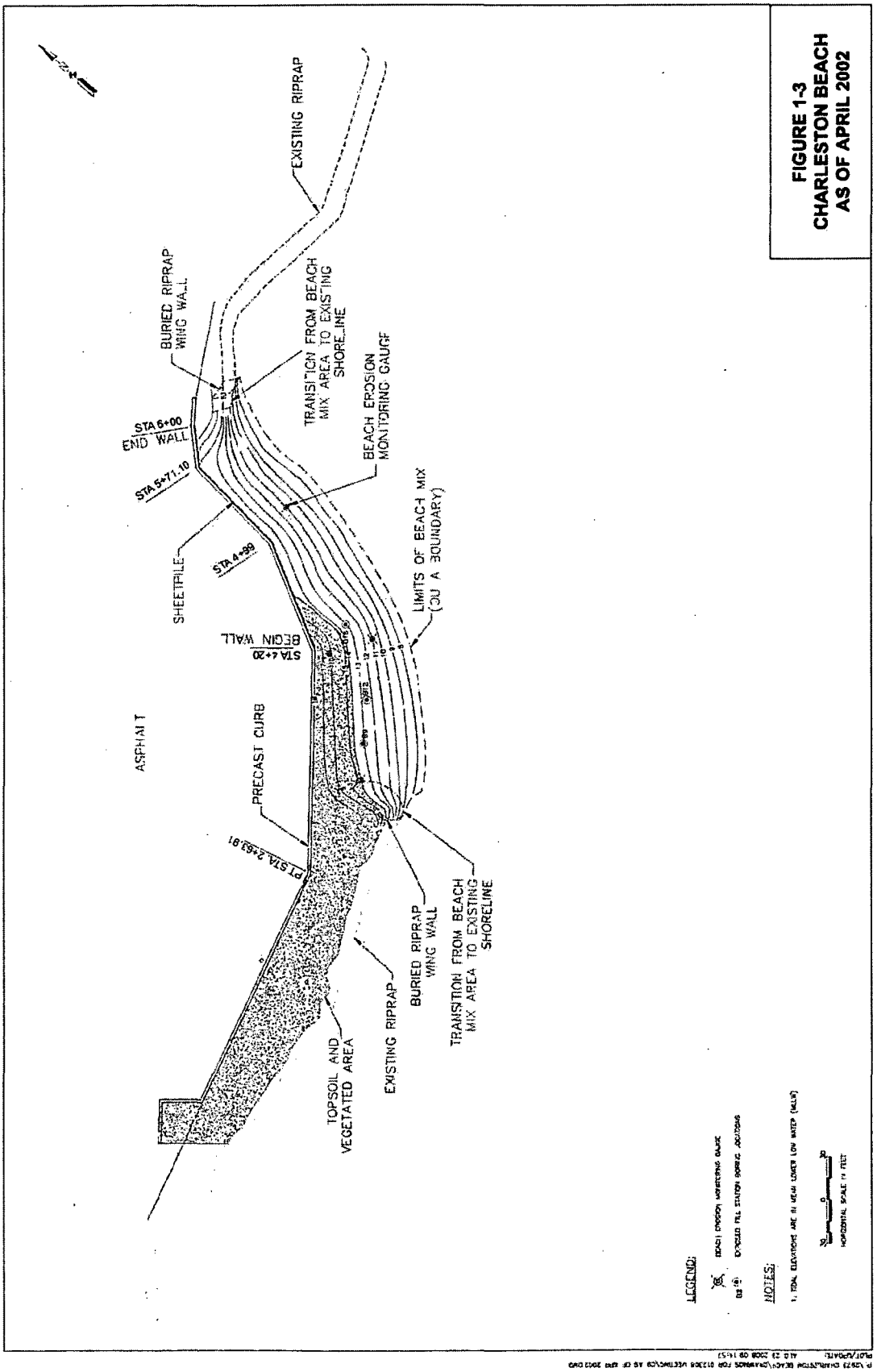

FIGURE 1-3
CHARLESTON BEACH
AS OF APRIL 2002

Figure 1-4. Charleston Beach, July 2007

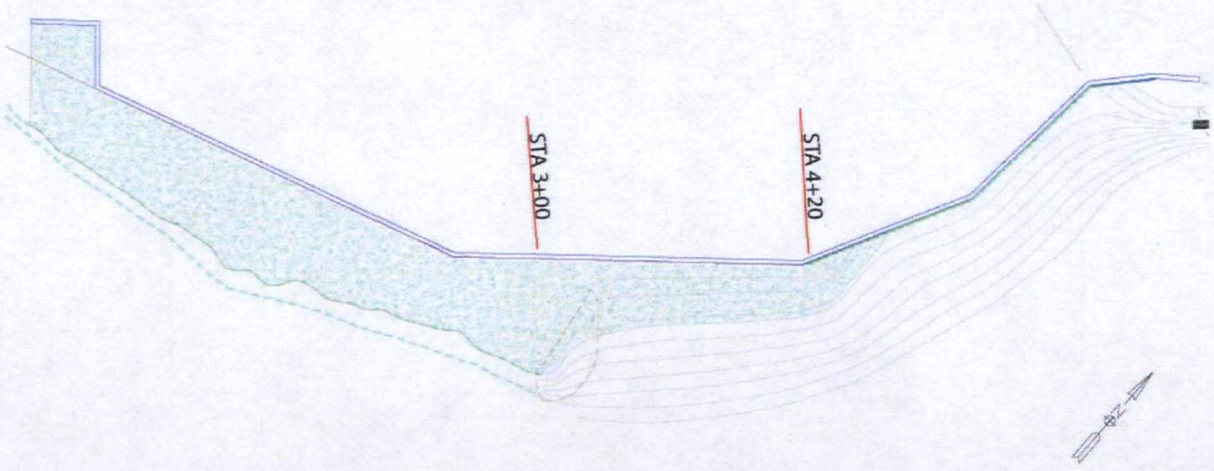

Figure 1-5. Location of Stations 3+00 and 4+20 in Charleston Beach, April 2002

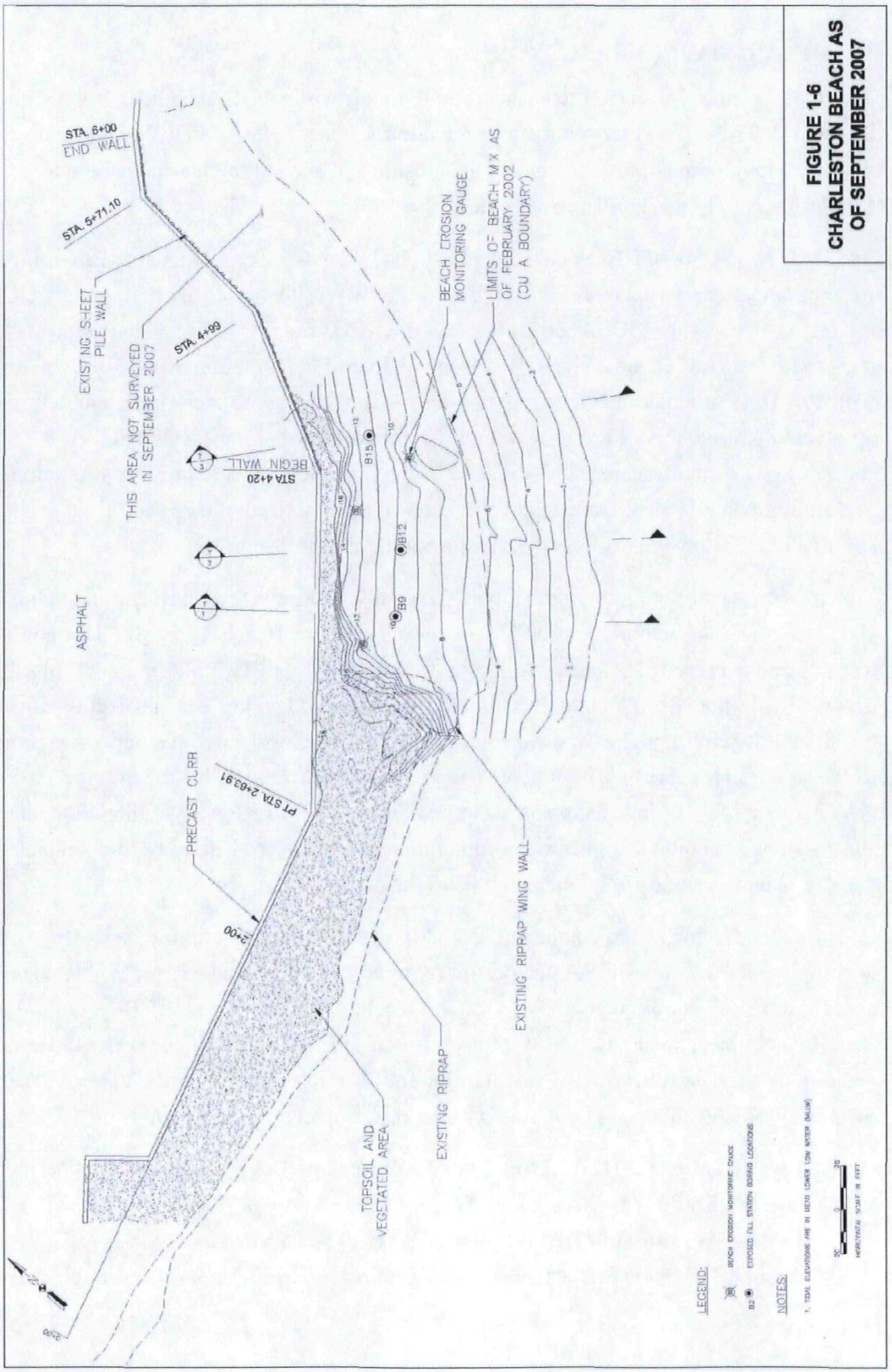
FIGURE 1-6
CHARLESTON BEACH AS OF SEPTEMBER 2007
STA. 6+00
END WALL
STA. 5+71.10
EXISTING SHEET PILE WALL
THIS AREA NOT SURVEYED IN SEPTEMBER 2007
STA. 4+99
BEGIN WALL STA 4+20
ASPHALT
PRECAST CURB
PT STA 2+63.91
2+00
BEACH EROSION MONITORING GAUGE
LIMITS OF BEACH MIX AS OF FEBRUARY 2002 (OU A BOUNDARY)
B15
B12
B9
EXISTING RIPRAP WING WALL
EXISTING RIPRAP
TOPSOIL AND VEGETATED AREA
LEGEND:
BEACH EROSION MONITORING GAUGE
B2 EXPOSED PILE STATION BORING LOCATIONS
NOTES:
1. TIDAL ELEVATIONS ARE IN BENT (LOWER LOW WATER DATUM)
HORIZONTAL SCALE IN FEET

1.2 REGULATORY FRAMEWORK

This repair action was performed as an interim repair while the Stakeholders (Navy, the Suquamish Tribe, U.S. Environmental Protection Agency [EPA], WDFW, and Ecology) develop a long term solution to control the erosion and protect the marine habitat at Charleston Beach in accordance with the OU A ROD.

The BNC is listed on the National Priorities List (NPL) as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site, and is divided into six OUs (OU A, OU B Marine, OU B Terrestrial, OU C, OU D, and OU NSC). Charleston Beach is located in Zone I of OU A. The ROD for OU A identified containment of fill as the primary remedy. To ensure that the OU A remedy remained effective, the interim repair action involved the placement of armor rock and fish mix material along 120 lineal feet of shoreline. The import material was placed to stabilize the bluff and provide a functionally performing fish mix beach during development of the long term repair solution that best controls the erosion and protects the marine habitat at Charleston Beach.

This interim repair action alternative was selected based on effectiveness, implementability, and cost. This selection is described in the Charleston Beach Fish Mix Design Interim Repair Action Preferred Alternative Design Memo (SES-TECH 2008b), a copy of which is provided in Appendix D. This repair alternative provided the best protection to human health and the environment, and was the most timely and cost effective approach compared to the other alternatives. The topsoil cover, armor rock, and fish mix provide an interim physical barrier that prevents exposure to contaminated fill material via direct contact route and minimizes potential transport of contaminated fill material directly into Sinclair Inlet, thereby reducing threats to human health and the environment.

Because the activities were conducted as a CERCLA cleanup action, the Navy was required to comply only with the substantive permit requirements identified as "applicable or relevant and appropriate" requirements (ARARs) or the "to be considered" (TBC) requirements. Off-site activities, such as waste transport and disposal, complied with all laws and regulations to their fullest extent including administrative requirements. The ARARs and TBC requirements that were complied with on this project are listed below.

- **Clean Water Act (CWA) Section 401 Water Quality Certification; Water Quality Standards for Surface Waters of the State of Washington (Revised Code of Washington [RCW] 90.48, WAC 173-201A)** - The CWA is regulated through 33 United States Code (USC) Section 1344. These laws and implementing

regulations establish surface water quality criteria for the protection of aquatic organisms and human health. Work activities were conducted during low tides when the beach and shoreline were not inundated with water to minimize turbidity impacts to Sinclair Inlet. Visual monitoring was performed and documented on a daily basis. No plumes of sediment were observed leaving the project site during construction activities. Ecology was closely involved during the planning phases of the repair action to ensure the on-site activities would be protective of surface water quality.

- **Rivers and Harbors Act (RHA) Section 10 Department of Army Permit –** Section 10 of the RHA prohibits the obstruction or alteration of navigable waters of the United States. A permit is required when undertaking any work in, over, or under navigable waters of the United States, or which affects the course, location, condition, or capacity of such water. As the project had the potential to affect a navigable waterway (Sinclair Inlet), the U.S. Army Corps of Engineers (USACE) District Engineer was notified of the project activities on 10 July 2008. Removal activities were conducted in a manner that minimized impact to Sinclair Inlet. A copy of the notice is provided in Appendix E.
- **CWA Section 404 Department of the Army Permit –** Section 404 of the CWA regulates the discharge of fill material into navigable waters of the United States, which includes placement of riprap. Because this project involved bank stabilization and work below the ordinary high water mark, the USACE District Engineer was notified of the project activities on 10 July 2008. Removal activities were conducted in a manner that minimized impact to Sinclair Inlet.
- **CWA Section 402 National Pollutant Discharge Elimination System (NPDES) Construction General Permit –** The NPDES Construction General Permit is required for stormwater discharges from construction activities that result in land disturbance of equal to or greater than one acre, where discharges enter waters of the United States. Because the project did not involve construction activities in a cumulative area greater than 1 acre, a Stormwater Notice of Intent was not required. Although a Stormwater Pollution Prevention Plan was not required, the Best Management Practices (BMPs) described in Section 2 were implemented to ensure stormwater pollution prevention, control of erosion, and protection of surface water quality throughout the construction activities.
- **Federal Coastal Zone Management Act (CZMA) and Washington State Shoreline Management Act (SMA) (RCW 90.58; WAC 173-16, -22, -27)** – The CZMA is regulated through 16 USC Section 1451 et seq. and administered by state

and local Shoreline Management Plans. Repair activities were conducted in a manner that met the state and City of Bremerton CZMA policy guidelines. As specified in the SMA Project Mitigation Status Report for the City of Bremerton Conditional Use Permit 99-086 on March 15, 2001, the Navy continues to negotiate in good faith with the Suquamish Tribe concerning their environmental mitigation proposals.

- **Endangered Species Act (ESA) of 1973 (16 USC Section 1531 et seq.)** – Informal consultation was completed with United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA)-Fisheries to determine the potential impacts of the original mitigation project on any federally listed species designated as threatened or endangered for compliance with Section 7 of the ESA. To ensure required and appropriate attention was given to threatened and endangered species, the Navy requested reinitiation of the formal ESA Section 7 consultation with NOAA-Fisheries on 13 November 2007. The request for reinitiation was based on the Navy's proposed emergency repair action to the erosion of the Charleston Beach habitat restoration project. A Biological Assessment (BA) requesting NOAA-Fisheries concurrence in their determination that the repair activities "may affect, not likely to adversely affect" for Puget Sound Chinook salmon and Puget Sound steelhead was also provided. Concurrence on the Navy's BA was received from NOAA-Fisheries on 20 November 2007. Copies of the BA and NOAA-Fisheries concurrence letter are provided in Appendix F. As the design change from a permanent repair action to an interim repair action did not cause an effect to the listed species or critical habitat that was considered in the consultation, and no new species was listed or critical habitat for another species had been designated since the consultation, reinitiation for the interim repair action was not required.
- **Washington Hydraulic Code, RCW 75.20.100-14; Hydraulic Code Rules, WAC 220-110 (Hydraulic Project Approval [HPA])** –During the mobilization phase of the initial emergency repair action in November 2007, WDFW performed an inspection of the beach to be impacted by the planned construction activities and found surf smelt eggs. In consultation with WDFW and the other Stakeholders, it was mutually agreed to halt construction and postpone the repair action until August 2008 when surf smelt spawning is at its lowest. Mitigation measures discussed during the planning phases of the interim repair action were included in the design (Appendix D). The repair activities were conducted to minimize potential impacts to fish habitat in accordance with the WDFW HPA requirements. The Navy is working

with WDFW and the other Stakeholders in developing a long term solution to control the erosion and protect the marine habitat in accordance with the OU A ROD.

- **Memorandum of Agreement (MOA) between the Suquamish Tribe and BNC** – As the Suquamish Tribe has adjudicated usual and accustomed fishing areas within Sinclair Inlet, including the BNC, the Navy is responsible for protecting tribal lands, tribal resources, and tribal treaty resources, including the usual and accustomed fishing areas. The mitigation action performed in 2001 and 2002 was one of the mitigation measures identified in the MOA regarding the construction and dredging in Sinclair Inlet. The Navy involved the Suquamish Tribe in the planning discussions for the repair actions. The Navy is working with the Suquamish Tribe and the other Stakeholders in developing a long term solution to control the erosion and protect the marine habitat in accordance with the OU A ROD.
- **National Historic Preservation Act of 1966 (16 USC Section 470 et seq.)** – The Navy coordinated with the Suquamish Tribe throughout the planning activities to address potential Tribal concerns. No archaeological or cultural resources were discovered during the repair action.
- **Offsite Rule for CERCLA Waste (40 Code of Federal Regulations [CFR] 300.440)** – Requires that wastes generated during a CERCLA action be received off site only at a facility that the EPA has determined "acceptable" to receive CERCLA wastes. Sediment, fill material, and sediment/fill material impacted wastes generated during the repair action were disposed at CERCLA-approved facilities (see Section 2.5).
- **Resource Conservation and Recovery Act (RCRA) Hazardous Waste Determination (40 CFR 262.11)** – Requires generators of solid waste to determine if their waste is regulated as hazardous waste according to 40 CFR 261. The waste streams generated during the repair action were evaluated via Generator knowledge and the waste streams were determined to not meet the RCRA hazardous waste criteria (see Sections 2.2 and 2.4).
- **Solid Waste Management Reduction and Recycling (RCW 70.95 and WAC 173-304-200)** – The solid waste regulations apply to the management and disposal of solid waste generated during the repair action. All solid wastes encountered during the repair action were handled in accordance with the solid waste regulatory requirements including appropriate disposal at a facility permitted for handling solid

waste and is CERLCA-approved. All waste handled on this project was designated according to BNC procedures.

2. REPAIR ACTIVITIES

The interim repair activities included preparation of project plans, placement of armor rock to stabilize the shoreline, placement of fish mix to provide beach habitat, removal of three erosion gauges and installation of three new erosion gauges, waste designation and disposal, site restoration, and performance of a post-construction survey. Interim repair field activities were conducted between 14 August 2008 and 28 August 2008, with initial site activities performed between 26 November 2007 and 14 December 2007 followed with site inspection and maintenance activities between 17 December 2007 and 15 August 2008. Record drawings of the interim repair are provided in Appendix C. Photographs of the field activities are provided in Appendix B.

Construction activities were completed in accordance with the Final Site Work Plan (SES-TECH 2007b) and the Design Change Notice (DCN-TO31-01) with field changes summarized below, approved by the Project Engineer. Copies of the Design Change Notice (DCN) and Field Change Requests (FCRs) are provided in Appendix G.

2.1 INITIAL (PERMANENT) REPAIR ACTIVITIES (26 NOVEMBER 2007 – 14 DECEMBER 2007)

Due to the extent of erosion, the Navy had originally intended to perform a permanent repair to the eroding shoreline at Charleston Beach as documented in the AM signed 5 September 2007. Mobilization activities commenced on 26 November 2007, but work was stopped on 28 November 2007 due to the presence of surf smelt eggs on the beach in the area to be impacted by the construction activities. A summary of the site activities performed prior to demobilization on 14 December 2007 is provided below.

2.1.1 Pre-Construction Activities

- On 27 September 2007, SES-TECH performed a site visit with Navy and BNC personnel to discuss the planned emergency repair action to be performed and waste designation of soil/fill material to be removed as part of the repair action.
- Conference calls were held between the Navy and Suquamish Tribe to discuss the repair remedy on 12 and 16 October 2007.

- A Request for Area Outage of the Charleston Beach parking lot from 26 November 2007 through 11 January 2008 was submitted on 19 October 2007. Approval was received on 15 November 2007.
- An Excavation Permit for performing the excavation needed to install the armor rock revetment was submitted on 19 October 2007. Approval was received on 20 November 2007.
- On 30 October 2007, the Stakeholders held a meeting to review the proposed repair design presented in the Draft Site Work Plan (SES-TECH 2007c). The Navy provided a copy of the draft plan to each of the Stakeholders for their review. A summary of the topics discussed and agreements reached are provided in Appendix H.
- On 13 November 2007, the Waste Information Sheets (WISs) and applicable landfill waste profiles for the waste streams potentially to be generated during the construction activities were submitted. BNC approval was received on 20 and 26 November 2007. Copies of the approved WISs and waste profiles are provided in Appendix I.
- The Navy submitted their BA of the impact the repair activities would have on listed and threatened species to NOAA-Fisheries on 13 November 2007. From their assessment, the Navy determined that the repair activities "may affect, not likely to adversely affect" for Puget Sound Chinook salmon and Puget Sound steelhead (see Appendix F).
- On 15 November 2007, the anticipated list of hazardous materials to be used during the construction activities was provided on the Contractor Hazardous Material Inventory (CHMI) form and submitted for review and approval. Approval was received from the BNC on 16 November 2007. A copy of the approved form is provided in Appendix J.
- On 16 November 2007, comments on the BA were received from the Suquamish Tribe.
- A Pre-construction and Mutual Understanding Meeting was held on 19 November 2007. Meeting minutes were submitted on 26 November 2007.
- On 20 November 2007, a utility locate was performed within the construction area. No underground utilities were identified.

- On 20 November 2007, the Navy received NOAA-Fisheries concurrence on their determination that the repair activities "may affect, not likely to adversely affect" for Puget Sound Chinook salmon and Puget Sound steelhead (see Appendix F).
- The Final Site Work Plan (SES-TECH 2007b) and Draft Fish Mix Design (SES-TECH 2007d) were submitted on 26 November 2007.
- Notice to Proceed with field work was received on 26 November 2007.

2.1.2 Construction Activities

- On 26 and 27 November 2007, mobilization activities commenced. Heavy equipment, materials, and supplies began arriving on the site. Filter rock (159.47 tons) and armor rock (157.72 tons) were delivered to the site and placed in lined Ecology Block cribs (20 blocks were delivered). Two rolls (9,000 square feet) of LP-8 non-woven geotextile fabric to be used in the construction of the armor rock revetment were also received at the site. Copies of the rock test results (see FCR-TO31-01) and geotextile fabric specifications indicating the materials meet the design specifications are included in Appendix G.
- On 26 and 27 November 2007, stormwater and erosion controls were implemented to minimize further erosion and the runoff of sediment and fill material into Sinclair Inlet to the maximum extent possible. Storm drain sediment inserts were placed in catch basins within the project site, wire back silt fence was placed below the toe of the bluff, and trucks and equipment traveled on the existing asphalt parking lot. Plastic sheeting was placed over the shoreline and upland areas and secured with sand bags prior to leaving the site. The stockpiles of armor rock and filter rock were also covered to prevent stormwater run-on and run-off.
- On 26 and 27 November 2007, the vegetation along the shoreline was removed and set aside for reuse (to the maximum extent practicable) after completion of the armor rock revetment. The large wood debris located in front of the bluff was removed and placed east of the site, upland from the beach.
- Surveying and staking of the site to guide in the construction of the armor rock revetment and placement of the fish mix was completed on 26 and 27 November 2007.
- On 27 November 2007, a WDFW biologist performed an inspection of the beach to be impacted by the planned construction activities and found surf smelt eggs.

- On 28 November 2007, grading and excavation of the southwestern corner of the shoreline above +12 feet MLLW commenced, but was halted within 1 hour as the Navy worked with the Stakeholders to address the presence of surf smelt eggs within the construction area. The surf smelt eggs indicate that the beach is functioning as intended by the mitigation action performed in 2001 and 2002. Delivery of additional import rock material was stopped.
- On 29 November 2007, one rolloff container with 9.98 tons of non-hazardous soil with incidental debris was transported from the project site by Enviro Con Trucking, Inc. (ECTI) to Olympic View Transfer Station (OVTS) in Bremerton, Washington for disposal at Columbia Ridge Landfill in Arlington, Oregon.
- On 29 November 2007, a site walk and meeting was held with the Stakeholders to discuss the presence of surf smelt eggs within the construction area, the extent of erosion at the site and its impact to the shoreline and Sinclair Inlet, and discuss repair options. Following the meeting, WDFW submitted a request to Ecology that the Navy stop work to allow the resource agencies more time to review and evaluate the proposed repair action (see Appendix K).
- On 30 November 2007, the Navy issued a Stop Work Notice to SES-TECH. SES-TECH was notified to demobilize from the project site.
- To minimize erosion and sedimentation and transport of fill material into Sinclair Inlet, on 3 December 2007, the plastic covering the shoreline and upland topsoil area was adjusted to cover any exposed areas and resecured with sand bags. The silt fence installed below the bluff was inspected and resecured. The catch basin sediment filters were inspected and cleared of any accumulated debris.
- On 3 December 2007, the second rolloff container with 16.73 tons of non-hazardous soil with incidental debris was transported from the project site by ECTI to OVTS for transport to Columbia Ridge Landfill. One hundred and fifty pounds of common trash was transported to OVTS by Brem-Air Disposal on 3 December 2007.
- On 4 December 2007, the plastic sheeting covering the filter rock and armor rock piles was removed.
- Demobilization of the heavy equipment and supplies was performed between 3 and 14 December 2007. The cribs of filter rock (159.47 tons) and armor rock (157.72 tons), 2 rolls of geotextile fabric, a partial roll of 10-mil plastic sheeting, 1 roll of silt fence, and the temporary fencing were left on site for future use during the interim repair action.

- On 17 December 2007, the Area Outage was extended to 30 March 2008 in anticipation that the Stakeholders would reach consensus on the repair action to be performed so that the repair could be completed prior to April 2008, the milestone the Navy had set to have the erosion protection repaired in the BNC Second Five-Year Review (Navy 2007b).

2.2 SITE INSPECTION AND MAINTENANCE ACTIVITIES (17 DECEMBER 2007 – 15 AUGUST 2008)

To minimize erosion and sedimentation and transport of fill material into Sinclair Inlet until the repair action could be implemented, inspection and maintenance activities of the shoreline and project site commenced on 17 December 2007. Bi-weekly inspections were performed during the winter months (rainy season) through 31 March 2008, and weekly inspections were performed through 15 August 2008. Inspections were also performed after significant rain events (0.5 inches of rain within a 24-hour period). The inspections involved inspecting the catch basin sediment filters for accumulated debris, ensuring the import rock stockpiles were stable, plastic sheeting had no ponding of water, plastic sheeting was covering the exposed shoreline and upland topsoil area, silt fence was secured and functioning properly, debris had not washed up against the silt fence, and the temporary fencing and entrance gate were secure. A summary of the significant site maintenance activities and observations are provided below. Routinely zip-ties were added to the bottom of the silt fence to secure the fence to the stakes and pieces of driftwood would be removed from behind (waterside) the silt fence and placed in the debris pile located east of the project site, upland from the beach.

- On 17 December 2007, a portion of the silt fence was replaced and additional plastic and sand bags were placed along the shoreline. The parking lot was cleaned up, the rock piles and extra plastic sheeting and geotextile fabric were stabilized and repositioned along the parking curb at the west end of the site, and debris was removed from in front of the silt fence and placed east of the project site, upland of the beach.
- On 27 December 2007, additional sand bags were repositioned over the plastic sheeting to secure the sheeting during the inclement weather.
- On 31 December 2007, the plastic sheeting was repositioned over exposed areas and secured with additional sand bags.
- On 7 January 2008, a large creosote beam had broken through the silt fence. The beam was removed and placed in the debris pile located east of the project site,

upland from the beach. The fence fabric was reconnected to the wire backing and plastic sheeting was repositioned over exposed areas.

- On 22 January 2008, there were visible signs of sloughing of soil and fill material from the embankment that was being contained by the plastic sheeting.
- On 4 February 2008, three additional sand bags were placed along the shoreline to secure the plastic sheeting. There was visible sloughing of the embankment that was being contained by the plastic sheeting, and landfill debris was becoming visible along the beach.
- On 14 February 2008, as requested by WDFW on 23 January 2008, the silt fence was repositioned to within 2 feet of the bluff to minimize the potential for trapping fish migrating along the shoreline (i.e., potential fish entrapment). The worn silt fencing was removed and placed in the laydown area and new silt fencing was installed. Prior to relocation of the silt fence, landfill debris present on the beach was removed, containerized, and placed in the laydown area. Over 10 gallons of debris was removed from in front of the bluff. To minimize water from going behind the plastic sheeting, the sheeting was pulled back and a small ditch was dug along the toe of the embankment and the edge of the sheeting was buried.
- On 6 March 2008, the sediment filter in the western most catch basin was removed and replaced with a new sediment filter.
- On 10 June 2008, the silt fence had become detached from many of the stakes after heavy winds. A 15-foot section of the plastic sheeting had also ripped near the toe of the embankment. Fifteen additional sand bags were ordered to add to another length of plastic sheeting to repair the damaged section. The repairs were completed on 12 June 2008.
- On 14 July 2008, a large tear was observed in the plastic sheeting. A new 60-foot by 20-foot section of sheeting was added to replace the torn section. Additional sand bags were added to secure the new sheeting.

2.3 STAKEHOLDER MEETINGS AND DISCUSSIONS (11 DECEMBER 2007 – 30 JUNE 2008)

As follow-up to the 29 November 2007 meeting, conference calls and meetings were held among the Stakeholders to reach consensus on a repair action that could be implemented to control the erosion at Charleston Beach. Consensus was finally attained on 30 June 2008. A summary of the calls/meetings, decisions reached, and actions taken is provided below.

- On 11 December 2007, the Navy provided a brief summary of the history of Charleston Beach from December 2000 through September 2007, and provided two additional permanent design alternatives to the Stakeholders for their review. A conference call to discuss the materials was held on 12 December 2007. A copy of the handouts, including a brief history of Charleston Beach, and the Stakeholder-agreed upon course of action for Charleston Beach is provided in Appendix L.
- On 8 January 2008, EPA issued a letter (see Appendix M) notifying the Navy that EPA and Ecology agree that the "situation at OU A does not pose an 'imminent and substantial endangerment' to the environment such that it necessitates a time-critical removal action". Per EPA and Ecology (and WDFW and Suquamish Tribe), "given the level of contamination in the upland soils, the recontamination threat is not immediate and is overridden by more pressing habitat concerns." The letter also stated that "it is appropriate to postpone the short-term repair of the beach until summer 2008 to prevent damage to species in the area and that the use of fish mix is considered an appropriate short-term solution for beach stabilization while design and implementation of a long term solution is underway."
- On 23 January 2008, a Coordination Meeting was held to brief Stakeholders on the current status of the project and site conditions at OU A, to discuss short-term solutions to erosion control, and begin discussion regarding long-term erosion control, given the regulatory framework and Navy funding constraints. Meeting minutes are provided in Appendix N. Also, concurrence was received from WDFW that construction could be scheduled within a time window from mid-July to mid-September without concern for interruption to construction activities due to the presence of surf smelt.
- Based on direction received from the Stakeholders, on 17 February 2008, the Navy postponed the time-critical removal action via Public Notice. On 4 March 2008, the Navy provided notice to EPA that they revised their Five-Year Review Milestone date for completion of the repair from 30 April 2008 to October 2008 (see Appendix O). The letter also provided notice that the remedy that would be in place by October 2008 would only be an interim solution while they perform a subsequent study and develop a design for completing long term erosion protection at the site.
- On 22 April 2008, the Navy held a Restoration Advisory Board Meeting to review the status of the remedies implemented at OU A and other BNC OUs. An overview of the ROD remedy and site background of OUA and Charleston Beach was

presented along with a presentation of the Navy's proposed repair actions to be performed at Charleston Beach.

- After Notice to Proceed with the interim repair action design was received on 9 April 2008, SES-TECH revisited the Draft Fish Mix Design Package submitted on 26 November 2007 (SES-TECH 2007d). Two interim repair alternatives, in addition to those presented in the Fish Mix Design Package, were provided to the Stakeholders on 16 May 2008 (SES-TECH 2008c).
- On 23 June 2008, a conference call was held to discuss the design alternatives, and select the "preferred interim repair remedy". A memorandum documenting the Stakeholders decision on the preferred interim repair remedy was finalized and submitted on 30 June 2008 (see Appendix D). The Final Design Package was submitted on 18 July 2008 (SES-TECH 2008d).

2.4 INTERIM REPAIR ACTIVITIES (14 AUGUST 2008 – 28 AUGUST 2008)

After the Stakeholders reached consensus on the interim repair action to be performed (SES-TECH 2008b), mobilization activities commenced on 14 August 2008. Construction activities were completed on 28 August 2008, with completion of the post-construction survey. The sequence of repair activities is summarized below.

2.4.1 Pre-Construction Activities

- On 17 March 2008, the Area Outage was extended to 30 September 2008.
- On 23 June 2008, a site visit was performed to evaluate the type of landfill debris present on the beach to ensure that proper waste management and disposal procedures are implemented during the interim repair action. Based on discussions with the BNC, all the landfill debris (excluding potential asbestos containing firebrick [i.e., brown firebrick]) can be included in one WIS for non-hazardous demolition and construction debris. The WIS was submitted on 30 June 2008 and approval was received on 7 July 2008. A copy of the approved WIS is provided in Appendix I. Per discussion with the Navy on 16 July 2008, it was determined that if "brown firebrick" was encountered, it would be left in place and covered with fish mix.
- To document the change from a permanent repair action to an interim repair action, and to address the personnel changes due to the postponement of the construction activities from November 2007 to 18 August 2008, a Design Change Notice (DCN-TO 31-01) was submitted on 28 July 2008 (see Appendix G).

- Notice to Proceed with the interim repair action was received on 31 July 2008.
- A Pre-construction Meeting was held on 15 August 2008. Meeting minutes were forwarded later that day.

2.4.2 Construction Activities

- Mobilization of temporary site facilities commenced on 14 August 2008 and was completed on 18 August 2008. Heavy equipment and miscellaneous tools and supplies were mobilized on 18 August 2008. Storm water and erosion controls were implemented as specified in the project plans and specifications. Plastic sheeting was placed over the exposed shoreline, upland top soil area, and the fish mix stockpiles prior to leaving the site. The lid for the rolloff waste container was shut when not in use.
- Upon completion of the site-specific orientation briefing on 18 August 2008, the field crew mobilized to Charleston Beach and removed the plastic sheeting from the shoreline. The site conditions were photographed (see Appendix B) and a surveyor documented the extent of erosion since the survey performed on 10 September 2007. The survey results indicate that the shoreline has eroded 8 feet at STA 3+40, 3 feet at STA 3+60 feet, and 2 feet at STA 4+00 resulting in an average width of the upland topsoil area between the top of the embankment to the parking curb of 8 feet (see Appendix C). The beach in front of the shoreline was inspected for the presence for potential asbestos containing firebrick (brown firebrick). One potential piece of brown brick was found along the toe of the bluff, near the west end of the site. This piece of brick was left in place to be covered with fish mix. All other non-native debris in the immediate vicinity of the shoreline was removed, placed in plastic bags, and then placed in the labeled, lined rolloff container.
- After removal of the plastic sheeting, the project Certified Industrial Hygienist (CIH) evaluated the site conditions and the existing analytical data to determine if personal air exposure monitoring would be required during performance of the repair activities. Based on the location of the work site in relation to the former sampling locations, the amount of fish mix material present on the beach, and the current condition of the bluff, it was determined that any dust generated during rock placement could not reasonably be expected to exceed Washington Industrial Safety and Health Administration (WISHA) action levels for arsenic and lead, and thus, personal exposure monitoring on site workers was not required. A copy of the CIH's evaluation is provided in Appendix P.

- Load-out of excess filter rock into the BNC-provided rail car began on 18 August 2008 with the first car filled and removed on 20 August 2008. As additional rail cars were not provided prior to demobilization of the front-end loader on 22 August 2008, the remaining filter rock was turned over to BNC personnel on 3 September 2008.
- Upon completion of the pre-construction erosion surveys and layout activities, the 157.72 tons of armor rock was placed along the shoreline on 19 August 2008. Placement began in the southwest corner where the scouring was most severe and armor rock was placed no steeper than 1.5H (horizontal):1V (vertical) slope as indicated on the design drawings and specifications. The armor rock was placed using a hydraulic excavator with thumb to its full course thickness in one operation (from bottom of slope to top of slope) and was placed in a manner that produced (to the maximum extent possible) a close-fitting and well-keyed mass of rock with minimum percentage of voids. Some hand-placing and rearranging of the smaller rock was performed to fill in the voids. As a result of the extent of erosion that had occurred along the shoreline between 10 September 2007 and 18 August 2008, combined with the fact that the interim repair must remain intact for a minimum of 3 years, armor rock was tied-into the existing riprap wall on the west edge of the site and placed up to STA 4+20 as shown in the record drawings provided in Appendix C. The toe of the armor rock runs fairly parallel to the September 2007 toe of slope. The silt fence was removed after placement of the armor rock.
- Delivery of fish mix commenced on 18 August 2008 and was concluded on 20 August 2008. A total of 829.42 tons of fish mix was received. A copy of the fish mix test results indicating the material meets the design specifications is included in Appendix G (see FCR-TO31-02).
- Placement of the fish mix to design elevations was performed by a shooter truck provided and operated by Peninsula Top Soil on 20 August 2008 with some hand grading near STA 3+20 on 21 August 2008. Fish mix was also placed via shovel down into the voids of the armor rock on 20 August 2008. As requested by WDFW on 23 January 2008, a fish mix bench was created above +11.74 feet MLLW to maximize stability of the shoreline. All 829.42 tons were placed. The erosion beach gauge located adjacent to the riprap wall was removed and two new erosion beach gauges were set at STA 3+40 and near STA 3+80, approximately 1 foot in front of the toe of the armor rock. As the beach erosion gauge (see Figure 1-4) had incurred damage from floating debris, this gauge was removed and replaced. Locations of the erosion gauges are provided in Appendix C. Rain showers present much of the day

prevented the generation of fugitive dust, which eliminated the need for water spray during the fish mix placement activities.

2.4.3 Site Restoration Activities

Site restoration activities included the following:

- Visual confirmation that the existing topsoil layer is a minimum 3 feet thick above the fill material between the bluff and parking curb. The visual inspection on 18 August 2008 confirmed that the 3-foot thick topsoil cap was still intact. At STA 3+40, topsoil was 3.8 feet thick; at STA 3+60, 3.5 feet thick; at STA 3+80, 3.3 feet thick; and at STA 4+00, 3.3 feet thick.
- On 21 August 2008, the vegetative debris was removed from the topsoil layer and placed in the rolloff waste container in accordance with the approved WIS. The sand from the sand bags was blended with the topsoil and then the topsoil was leveled to maintain the 3-foot minimum thickness requirement. The empty bags were also placed in the rolloff waste container. The excess material was placed past STA 4+20 around the root wad and woody debris. LP-8 non-woven geotextile fabric was then placed over the exposed topsoil layer and then secured in place with an average 6-inch thick layer of filter rock placed with the hydraulic excavator and front-end loader. The geotextile fabric was placed parallel to the slope and was laid smooth and free of tension, stress, folds, wrinkles, or creases. The filter rock was placed to produce a well-graded mass of rock with minimum voids. Approximately 13 cubic yards of rock was used with the remaining excess material transferred to the Navy (see above).
- The "Do Not Disturb – Habitat Restoration" sign removed on 26 November 2007 was cleaned and reinstalled in the vegetative area immediately west of the filter rock layer on 21 August 2008.
- Seven Ecology Blocks were demobilized from the site on 21 August 2008 and the remaining 13 blocks were turned over to the BNC on 3 September 2008.
- The asphalt parking lot was swept clean on 22 and 25 August 2008. The catch basin sediment filters were removed and placed in the rolloff waste container in accordance with the approved WIS. The street sweepings were also placed into the waste container. As the construction activities did not adversely affect the asphalt parking lot or the concrete parking curbs, repairs were not needed.
- The heavy equipment was demobilized from the site between 22 August and 26 August 2008.

- On 26 August 2008, the labeled rolloff waste container of non-hazardous construction and demolition debris was transported from the project site to Union Pacific Railroad in Seattle, Washington for transport to Columbia Ridge Landfill in Arlington, Oregon.
- The final site-walk through was performed on 26 August 2008 with Navy personnel. Five punch list items were identified: removal of the rebar and caps along beach after completion of the post-construction survey, conex, temporary fencing, filter rock (which will be removed by the BNC), and 13 Ecology Blocks (which will be removed by the BNC following removal of the filter rock).
- On 28 August 2008, the CHMI form was updated to document the amount of hazardous material used during completion of the repair activities. A copy of the final report is provided in Appendix J.
- The post-construction survey was performed on 27 and 28 August 2008. The survey was conducted to document the final surface elevation of the beach and shoreline. The area between STA 3+00 and STA 6+00, plus approximately 5 feet north and south of the listed stations was surveyed at 20-foot transects. The survey extended from the top of parking curb to beyond the OU A boundary line. Based on the post-construction survey data, the eastern most erosion marker is approximately 2 feet below ground surface. Record drawings are provided in Appendix C.
- The rebar and caps along the beach were removed on 29 August 2008. The wood stakes indicating the limits of the fish mix placement and the OU A boundary were left in place as requested by the Navy.
- The Final Contractor's Monthly Waste Summary Report was submitted on 29 August 2008. Copies of the waste summary reports are provided in Appendix I.
- The temporary fencing and conex were demobilized from the site on 29 August 2008 and 3 September 2008, respectively.

2.5 DISPOSAL

Table 2-1 summarizes the quantities and disposition of the various materials and waste streams generated during the repair activities. Corresponding WISs, Contractor's Monthly Project Waste Summary Reports, weight tickets, and Certificates of Disposal are included in Appendix I.

Table 2-1. Waste Stream Summary

Waste Stream	Estimated Quantities	Disposal Category	WIS #	Permit #	WSN #	Transporter	Disposal Facility	Technology
Non-hazardous Soil with Incidental Debris (pieces of unpainted wood, personal protective clothing, contaminated poly liner, gravel, slag, concrete and asphalt pieces)	26.71 tons	Non-hazardous	742681	100738WA	CN-635-0027	ECTI	OVTS to Columbia Ridge Landfill	Landfill
Common Trash	150 pounds	Non-hazardous	742680	N/A	CN-985-0001	Brem-Air Disposal / Waste Management Inc.	OVTS	Landfill
Non-hazardous Demolition Debris (unpainted wood, slag, incidental concrete, incidental asphalt, poly sheeting, styrofoam, used PPE, used silt fence, used storm drain catch basin inserts, wood and vegetation, plastic, brick, and non-asbestos containing firebrick)	3.36 tons	Non-hazardous	742679	N/A	CN-635-0701	ECTI to Union Pacific Railroad (Seattle)	Columbia Ridge Landfill	Landfill

3. RESULTS OF THE INTERIM REPAIR ACTION

As of 28 August 2008, the interim repair action at Charleston Beach has been completed in accordance with the project plans and Navy requirements. Record drawings are provided in Appendix C.

A total of 157.72 tons of armor rock and 829.42 tons of fish mix were placed to stabilize the bluff and enhance the beach habitat at Charleston Beach while the Stakeholders develop a long term solution to control the erosion and protect the marine habitat at Charleston Beach in accordance with the OU A ROD. The armor rock was placed in front of 120 lineal feet of eroding embankment and the fish mix was placed between +7 feet MLLW and +14.7 feet MLLW to provide erosion protection over the exposed fill and to provide habitat for juvenile salmon and surf smelt. A fish mix bench was also installed above +11.74 feet MLLW to maximize stability of the shoreline.

Based on the 10 September 2007 survey data, the embankment had eroded up to 14 feet into the landfill and the fish mix along the west end of the beach completely eroded away such that fill material previously underlying the fish mix cover was exposed. Between 10 September 2007 and 18 August 2008, the embankment eroded an additional 2 to 8 feet. Based on the extent of erosion that has occurred since completion of the mitigation action in April 2002, the fish mix has been shown not to be protective per the OU A ROD. As a result of the erosion that has occurred, approximately an additional 1,600 square feet of intertidal habitat (between +7 and +14 feet MLLW) along 120 lineal feet of shoreline has been created between STA 3+00 and STA 4+20. Between STA 4+20 and STA 6+00, approximately an additional 500 square feet of intertidal habitat has been created. Since OU A extends out to the edge of the former riprap wall (i.e., OU A boundary limits), action must be taken to restore erosion protection for the full extent of OU A in a manner that is consistent with the ROD.

For future beach restoration or construction activities proposed east of the existing riprap wall up to the eastern end of the sheet pile wall, previous in-situ soil sample data indicates the soil between the existing shoreline and up to the parking curb to be non-hazardous (FWENC 2001). Previous in-situ soil sampling conducted west of the existing riprap wall found lead concentrations exceeding the 5 milligrams per liter Toxicity Characteristic Leaching Procedure hazardous waste criteria (FWENC 2001). No in-situ soil sampling was conducted of the material beneath the asphalt parking lot.

In-situ sediment sampling conducted in June 2001 indicated exceedances of the Sediment Quality Standards (SQS) criteria for metals on both the east and west ends of the site. The samples collected from the three borings along the beach between STA 3+40 and STA 4+40 had metal concentrations exceeding the corresponding SQS values for mercury, copper, lead, and zinc. Therefore, covering the area (i.e., placement of the 3-foot thick layer of fish mix) was deemed necessary in 2002. Two of the samples collected west of the project site also had exceedances of polychlorinated biphenyls, polynuclear aromatic hydrocarbons, and phenol (FWENC 2001).

As part of the interim repair action, two new beach erosion gauges were installed immediately in front of the toe of the armor rock, and another was installed in front of the beach to replace the damaged gauge that was installed in 2002. A fourth gauge that was installed in 2002 remains buried at the eastern end of the beach. These gauges were installed to visually monitor the erosion of the fish mix. The fish mix must be monitored to ensure continued protection of human health and the environment per the OU A ROD, until a long term solution to control the erosion at the site is implemented. The locations of the four erosion gauges are provided on the record drawings in Appendix C.

4. REFERENCES

FWENC (Foster Wheeler Environmental Corporation). 2003. Point Paper for Charleston Beach Fish Mix Erosion, Bremerton Naval Complex, Bremerton, Washington. October 3, 2003.

FWENC. 2002. Final Closure Report, Charleston Beach Habitat Restoration Project, Bremerton Naval Complex, Bremerton, Washington. RACII/Delivery Order No. 92. June 28, 2002.

FWENC. 2001. Final Site Work Plan, Charleston Beach Habitat Restoration, Bremerton Naval Complex, Bremerton, Washington. RACII/Delivery Order No. 92. October 29, 2001.

Navy (U.S. Navy). 2007a. Action Memorandum, OU A Charleston Beach, Bremerton Naval Complex. September 5, 2007.

Navy. 2007b. Final Second Five-Year Review, Bremerton Naval Complex, Bremerton, Washington. October 2007.

SES-TECH (Sealaska Environmental Services, LLC-Tetra Tech EC, Inc. Joint Venture). 2008a. OU A Fall 2007 Shoreline Inspection Letter Report, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 37. January 16, 2008.

SES-TECH. 2008b. Charleston Beach Fish Mix Design Interim Repair Action Preferred Alternative Design Memo. Task Order No. 31. June 30, 2008.

SES-TECH. 2008c. Revised Draft Appendix F, Site Work Plan, Time Critical Removal Action, OU A Charleston Beach, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 31. May 16, 2008

SES-TECH. 2008d. Final Appendix F, Site Work Plan, Time Critical Removal Action, OU A Charleston Beach, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 31. July 18, 2008.

SES-TECH. 2007a. Final 2007 Annual Inspection Report, Long-Term Monitoring at OU A and OU NSC, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 20. October 31, 2007.

SES-TECH. 2007b. Final Site Work Plan, Time Critical Removal Action, OU A Charleston Beach, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 31. November 26, 2007.

SES-TECH. 2007c. Draft Site Work Plan, Time Critical Removal Action, OU A Charleston Beach, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 31. October 29, 2007.

SES-TECH. 2007d. Draft Appendix F, Site Work Plan, Time Critical Removal Action, OU A Charleston Beach, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 31. November 26, 2007.

SES-TECH. 2006. Final 2006 Annual Inspection Report, Long-Term Monitoring at OU A and OU NSC, Bremerton Naval Complex, Bremerton, Washington. Task Order No. 1. December 14, 2006.

URS (URS Consultants). 1996. Final Record of Decision, Operable Unit A, Missouri Parking Lot and Charleston Beach, Bremerton Naval Complex, Bremerton, Washington. December 1996.

URS. 1995a. Final Remedial Investigation, Operable Unit A, Puget Sound Naval Shipyard, Bremerton, Washington. Prepared for U.S. Navy Comprehensive Long-term Environmental Action Navy (CLEAN), N62474-89-D-9295. Seattle, Washington. August 14, 1995.

URS. 1995b. Final Feasibility Study, Operable Unit A, Puget Sound Naval Shipyard, Bremerton, Washington. Prepared for U.S. Navy CLEAN, N62474-89-D-9295. Seattle, Washington. October 23, 1995.

APPENDIX A

MITIGATION ACTION DESIGN DRAWINGS

NO	DATE	REVISION	BY	CH	APPROVED
3	10/29/01	ISSUED FOR CONSTRUCTION	KSK	CTH	JLS
2	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
1	4/29/02	RECORD DRAWING	KSK	CTH	JLS

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON
DELIVERY ORDER NO. 92
CONTRACT # N44255-95-D-6030

DRAWING LIST		
DWG NO.	TITLE	SHEET NO.
ED92CS01	TITLE SHEET AND DRAWING LIST	SHEET 1 OF 9
ED92CS01	VICINITY, KEY, AND SITE LOCATION	SHEET 2 OF 9
ED92EC02	EXISTING CONDITIONS	SHEET 3 OF 9
ED92GP03	GRADING PLAN	SHEET 4 OF 9
ED92XS05	CROSS SECTIONS A & B	SHEET 5 OF 9
ED92XS05	CROSS SECTIONS C & D	SHEET 6 OF 9
ED92XS05	CROSS SECTIONS E & F	SHEET 7 OF 9
ED92DT03	SECTIONS AND DETAILS	SHEET 8 OF 9
ED92DT04	DRAFT VEGETATION PLAN	SHEET 9 OF 9

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RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

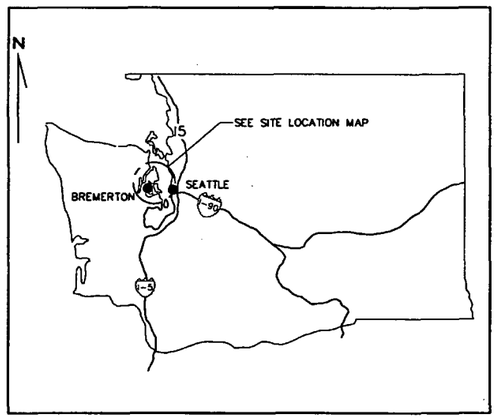
CHARLESTON BEACH HABITAT RESTORATION
TITLE SHEET AND DRAWING LIST

FOSTER WHEELER ENVIRONMENTAL CORPORATION

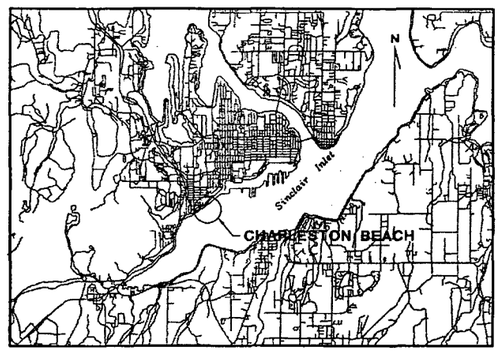
DESIGNED: JMS
DRAWN: KSK
CHECKED: CTH
APPROVED

SIZE: D
SCALE: AS NOTED
DRAWING NO.: ED092CS01
1/9

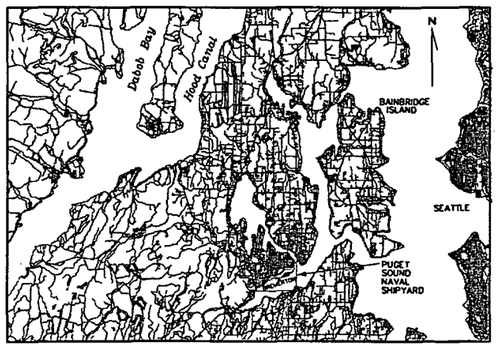
NO	DATE	REVISION	BY	CH	APPROVED
3	10/29/01	ISSUED FOR CONSTRUCTION	KSK	CTH	JLS
2	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
1	4/29/02	RECORD DRAWING	KSK	CTH	JLS



KEY MAP



SITE LOCATION MAP



VICINITY MAP

RECORD DRAWING

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION
VICINITY, KEY AND SITE LOCATION

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JMS	APPROVED		
DRAWN: KSK			
CHECKED: CTH			
SIZE: D	SCALE: AS NOTED	DRAWING NO.: ED092CS01	2/9

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NO	DATE	REVISION	BY	CH	APPROVED
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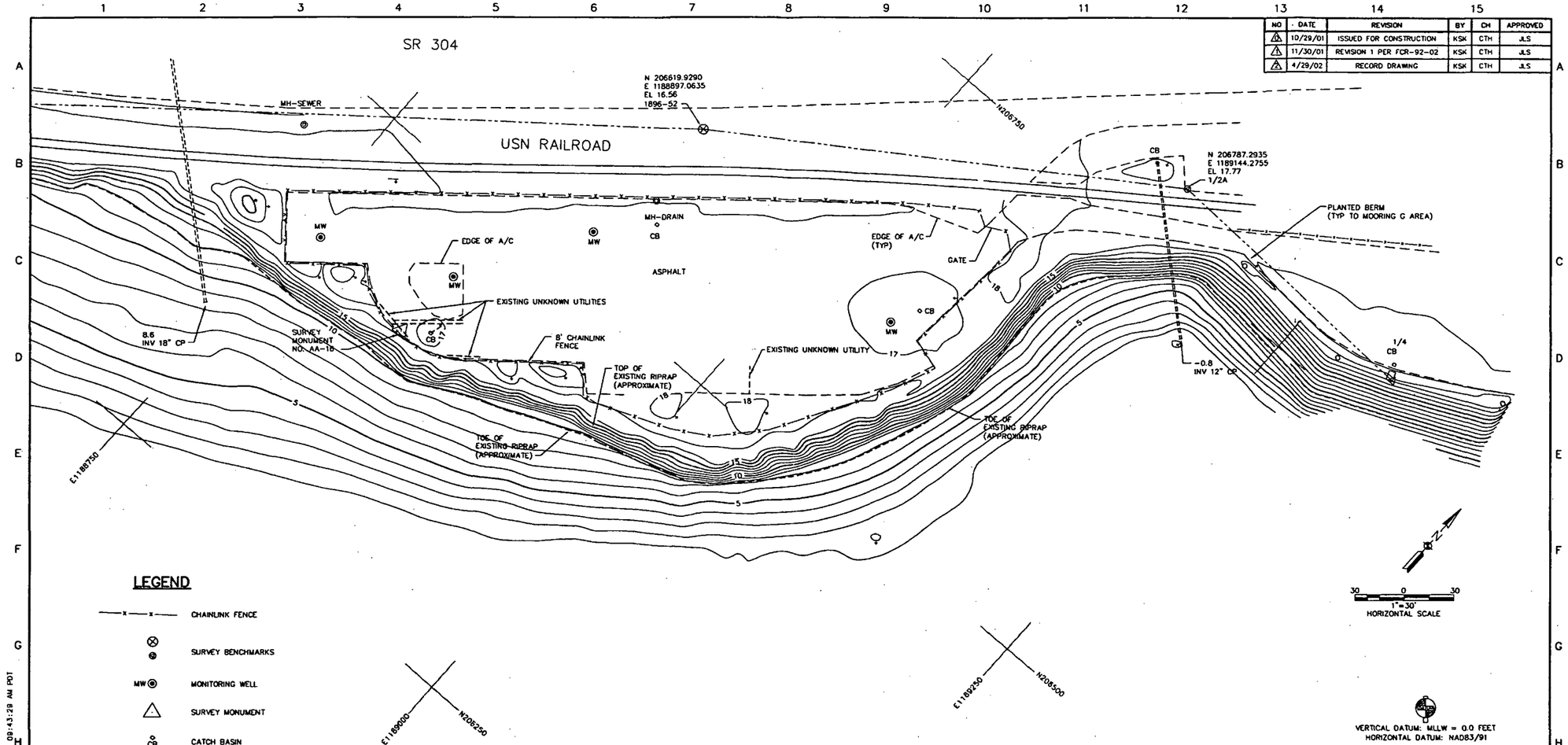
2	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
3	4/29/02	RECORD DRAWING	KSK	CTH	JLS



LEGEND

—x—x—	CHAINLINK FENCE
⊗ ◉	SURVEY BENCHMARKS
MW◉	MONITORING WELL
△	SURVEY MONUMENT
CB	CATCH BASIN
A/C	ASPHALT CONCRETE
MH	MANHOLE
EL	ELEVATION
CP	CONCRETE PIPE
INV	INVERT
MHHW	MEAN HIGHER HIGH WATER
MLLW	MEAN LOWER LOW WATER
TYP	TYPICAL

NOTE: BASE MAP PREPARED FROM SURVEY PERFORMED BY PARAMETRIX DECEMBER 14, 2000

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION
EXISTING CONDITIONS

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JMS	APPROVED		
DRAWN: KSK	JLS		
CHECKED: CTH			
SIZE D	SCALE: AS NOTED	DRAWING NO. ED092EC02	3/9

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NO	DATE	REVISION	BY	CH	APPROVED
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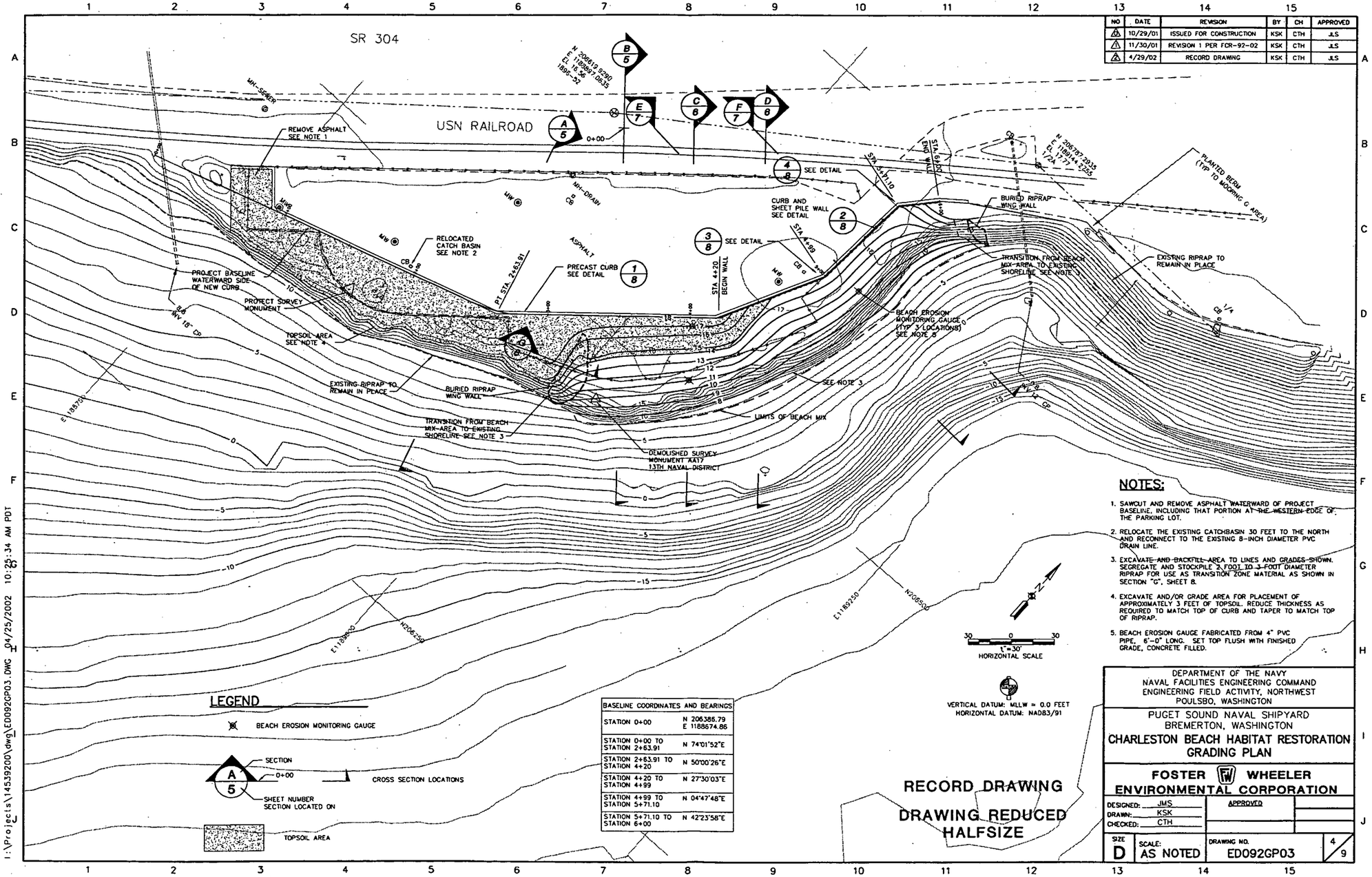
2	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
1	4/29/02	RECORD DRAWING	KSK	CTH	JLS



NOTES:

1. SAWCUT AND REMOVE ASPHALT WATERWARD OF PROJECT BASELINE, INCLUDING THAT PORTION AT THE WESTERN EDGE OF THE PARKING LOT.
2. RELOCATE THE EXISTING CATCHBASIN 30 FEET TO THE NORTH AND RECONNECT TO THE EXISTING 8-INCH DIAMETER PVC DRAIN LINE.
3. EXCAVATE AND BACKFILL AREA TO LINES AND GRADES SHOWN. SEGREGATE AND STOCKPILE 2 FOOT TO 3 FOOT DIAMETER RIPRAP FOR USE AS TRANSITION ZONE MATERIAL AS SHOWN IN SECTION "G", SHEET 8.
4. EXCAVATE AND/OR GRADE AREA FOR PLACEMENT OF APPROXIMATELY 3 FEET OF TOPSOIL. REDUCE THICKNESS AS REQUIRED TO MATCH TOP OF CURB AND TAPER TO MATCH TOP OF RIPRAP.
5. BEACH EROSION GAUGE FABRICATED FROM 4" PVC PIPE, 6'-0" LONG. SET TOP FLUSH WITH FINISHED GRADE, CONCRETE FILLED.

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION GRADING PLAN

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JMS	APPROVED		
DRAWN: KSK			
CHECKED: CTH			
SIZE D	SCALE: AS NOTED	DRAWING NO. ED092GP03	4/9

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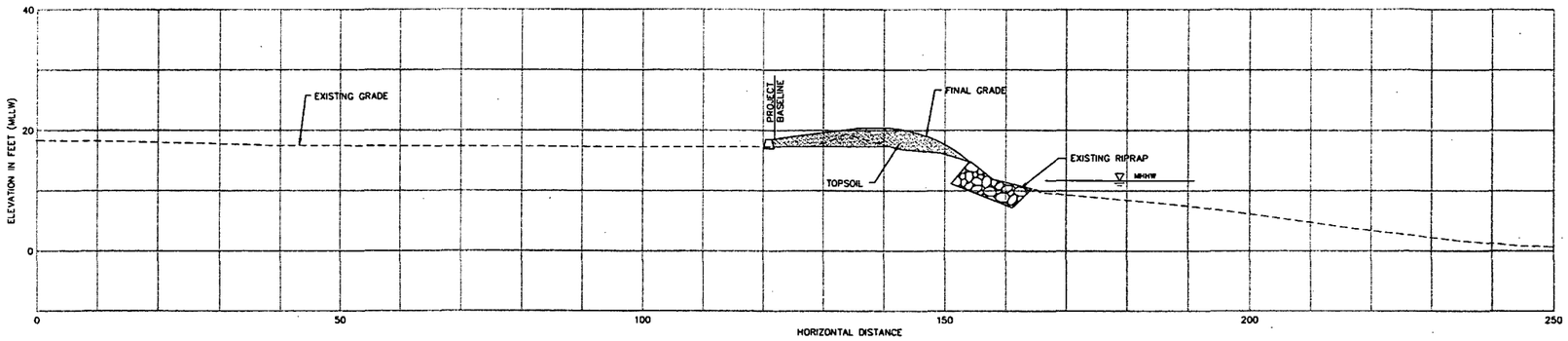
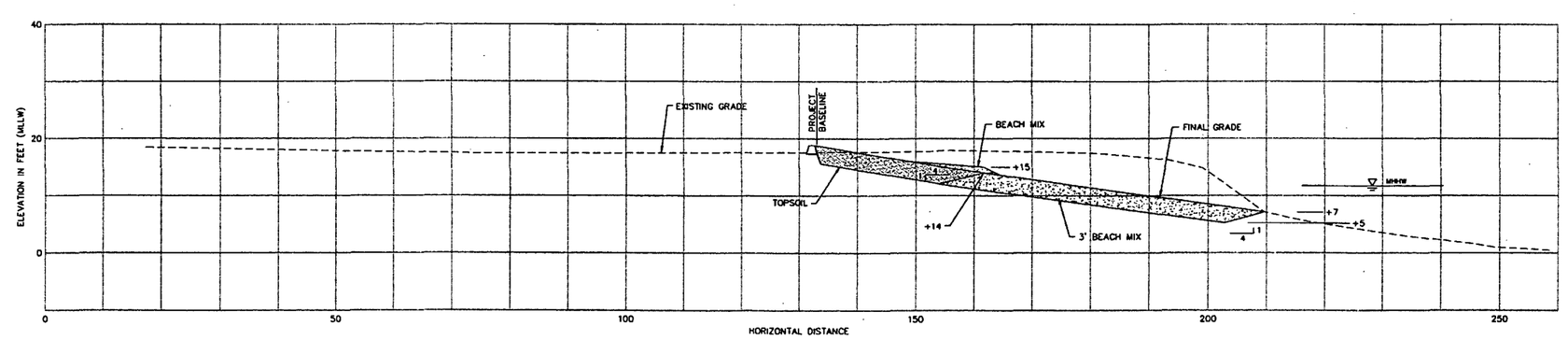
NO	DATE	REVISION	BY	CH	APPROVED
1	10/29/01	ISSUED FOR CONSTRUCTION	KSK	CTH	JLS
2	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
3	4/29/02	RECORD DRAWING	KSK	CTH	JLS



SECTION A/4



SECTION B/4

5 2.5 0 5 10 15
1"=10'
HORIZONTAL SCALE

5 2.5 0 5 10 15
1"=10'
VERTICAL SCALE

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION
CROSS SECTIONS A & B

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JMS
DRAWN: KSK
CHECKED: CTH
APPROVED

SIZE: D
SCALE: AS NOTED
DRAWING NO. ED092XS05
5/9

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NO	DATE	REVISION	BY	CH	APPROVED
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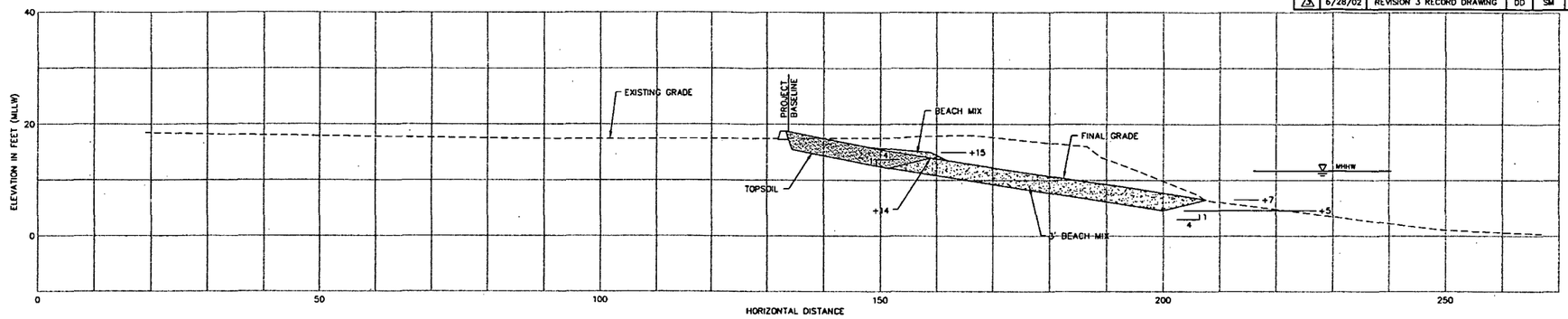
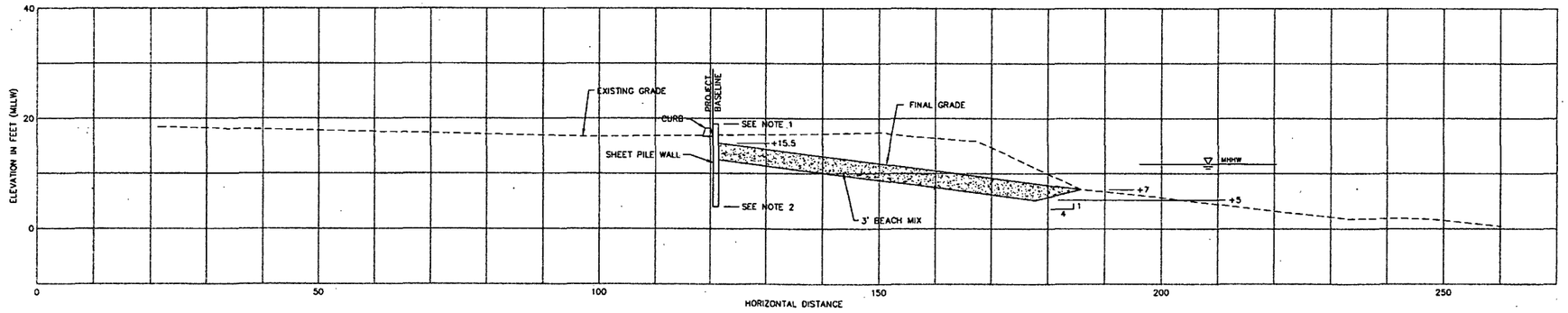
3	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
2	4/29/02	RECORD DRAWING	KSK	CTH	JLS
1	6/28/02	REVISION 3 RECORD DRAWING	DD	SM	JMS



SECTION C/4



SECTION D/4

NOTES:

1. TO BETTER FOLLOW ELEVATIONS OF EXISTING ASPHALT, TOP OF SHEET PILE ELEVATIONS ARE AS FOLLOWS:
   - STA. 4+20 TO 5+24 – ELEV. 17.5' MLLW
   - STA. 5+24 TO 5+45 – ELEV. 18.0' MLLW
   - STA. 5+45 TO 6+00 – ELEV. 18.33' MLLW
2. PILE DRIVING RECORD SUMMARY ⚠4

PAIR NUMBER (starts at 4+20)	PILE LENGTH	CUT-OFF ELEVATION	PENETRATION	TIP ELEVATION
1 – 10	17.5 feet	17.5 feet	17 feet	0.5 feet
11 – 29 plus corner	17.5 feet	17.5 feet	15 feet	2.5 feet
30 - 33	17.5 feet	17.5 feet	16 feet	1.5 feet
34	17.5 feet	17.5 feet	15 feet	2.5 feet
35 - 39	17.5 feet	18 feet	15 feet	3 feet
40 – 41	17.5 feet	18 feet	15 feet	3 feet
42 – 57 feet	17.5 feet	18.33 feet	15.5 feet	2.83 feet
58 – 60 plus corner	17.5 feet	18.33 feet	15.5 feet	2.83 feet

5 2.5 0 5 10 15
1"=10'
HORIZONTAL SCALE

5 2.5 0 5 10 15
1"=10'
VERTICAL SCALE

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION CROSS SECTIONS C & D

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JMS
DRAWN: KSK
CHECKED: CTH
APPROVED:

SIZE D | SCALE: AS NOTED | DRAWING NO. ED092XS05 | 6/9

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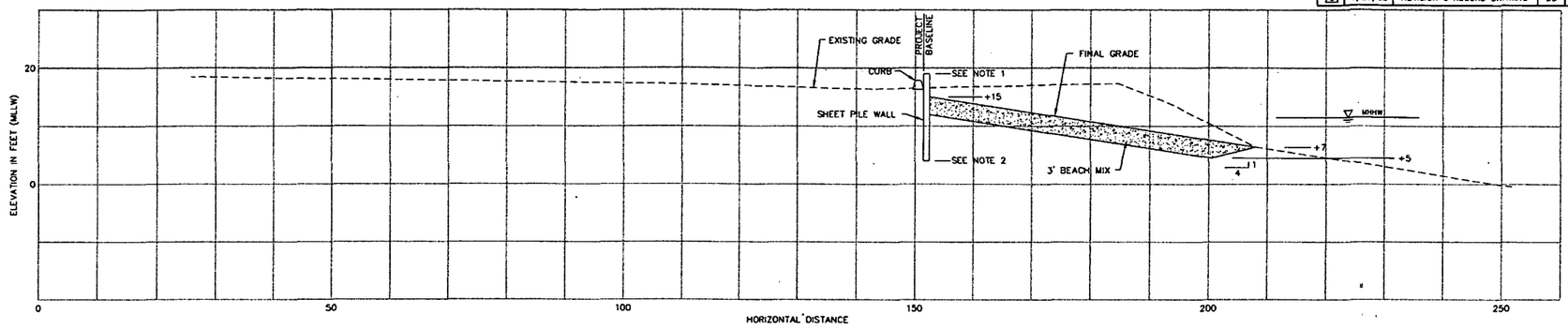
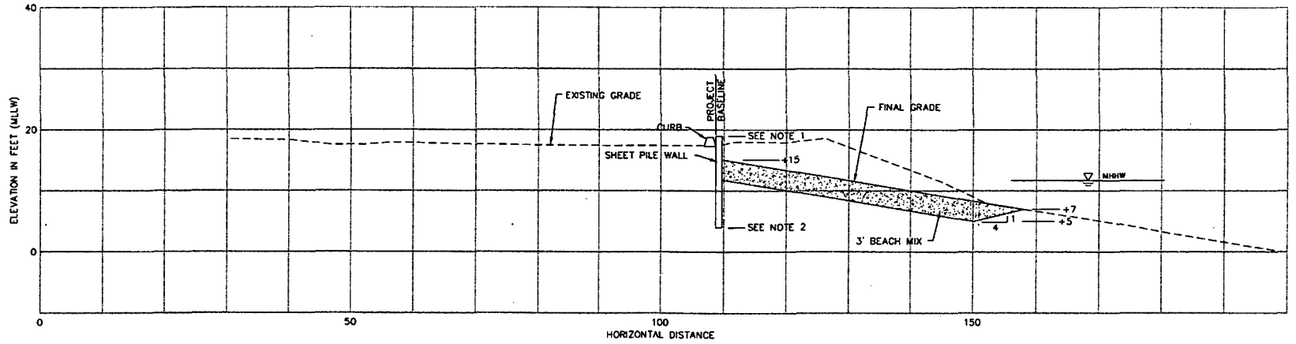
2	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
3	4/29/02	RECORD DRAWING	KSK	CTH	JLS
4	6/28/02	REVISION 3 RECORD DRAWING	DD	SM	JMS



SECTION E/4



SECTION F/4

5 2.5 0 5 10 15
1"=10'
HORIZONTAL SCALE

5 2.5 0 5 10 15
1"=10'
VERTICAL SCALE

NOTES:

1. TO BETTER FOLLOW ELEVATIONS OF EXISTING ASPHALT, TOP OF SHEET PILE ELEVATIONS ARE AS FOLLOWS:
   - STA. 4+20 TO 5+24 – ELEV. 17.5' MLLW
   - STA. 5+24 TO 5+45 – ELEV. 18.0' MLLW
   - STA. 5+45 TO 6+00 – ELEV. 18.33' MLLW
2. PILE DRIVING RECORD SUMMARY (3)

PAIR NUMBER (starts at 4+20)	PILE LENGTH	CUT-OFF ELEVATION	PENETRATION	TIP ELEVATION
1 – 10	17.5 feet	17.5 feet	17 feet	0.5 feet
11 – 29 plus corner	17.5 feet	17.5 feet	15 feet	2.5 feet
30 - 33	17.5 feet	17.5 feet	16 feet	1.5 feet
34	17.5 feet	17.5 feet	15 feet	2.5 feet
35 - 39	17.5 feet	18 feet	15 feet	3 feet
40 – 41	17.5 feet	18 feet	15 feet	3 feet
42 – 57 feet	17.5 feet	18.33 feet	15.5 feet	2.83 feet
58 – 60 plus corner	17.5 feet	18.33 feet	15.5 feet	2.83 feet

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION
CROSS SECTIONS E & F

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JMS
DRAWN: KSK
CHECKED: CTH
APPROVED

SIZE D | SCALE: AS NOTED | DRAWING NO. ED092XS05 | 7/9

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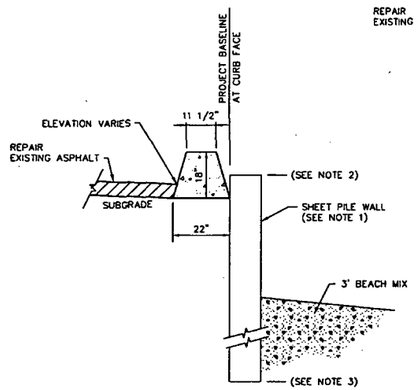
3	11/30/01	REVISION 1 PER FCR-92-02	KSK	CTH	JLS
2	4/29/02	RECORD DRAWING	KSK	CTH	JLS
1	6/28/02	REVISION 3 RECORD DRAWING	DD	SM	JMS



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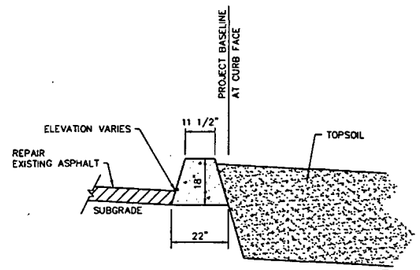
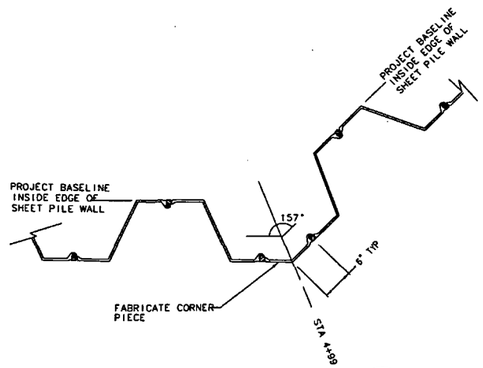
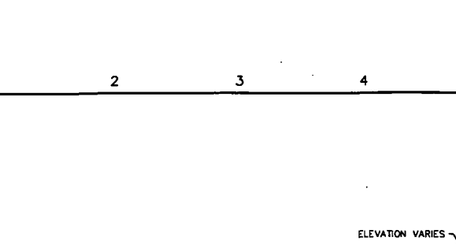


TYPICAL CURB DETAIL 1/4
NOT TO SCALE

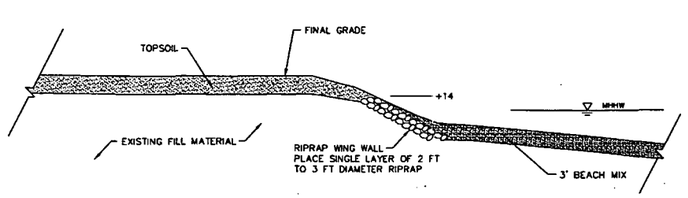


SHEET PILE PLAN @ STA 4+99 3/4
NOT TO SCALE

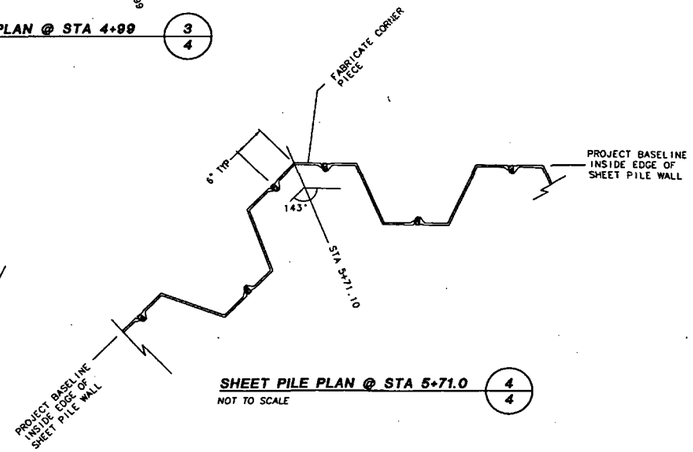


PLAN

TYPICAL CURB AND SHEET PILE WALL DETAIL 2/4
NOT TO SCALE



TRANSITION SECTION G/4
NOT TO SCALE



SHEET PILE PLAN @ STA 5+71.0 4/4
NOT TO SCALE

NOTES:

1. SEE SPECIFICATIONS SECTION 02457 FOR MATERIAL DETAILS.
2. TO BETTER FOLLOW ELEVATIONS OF EXISTING ASPHALT, TOP OF SHEET PILE ELEVATIONS ARE AS FOLLOWS:
   STA. 4+20 TO 5+24 – ELEV. 17.5' MLLW
   STA. 5+24 TO 5+45 – ELEV. 18.0' MLLW
   STA. 5+45 TO 6+00 – ELEV. 18.33' MLLW
3. PILE DRIVING RECORD SUMMARY. ⚠4

PAIR NUMBER (starts at 4+20)	PILE LENGTH	CUT-OFF ELEVATION	PENETRATION	TIP ELEVATION
1 – 10	17.5 feet	17.5 feet	17 feet	0.5 feet
11 – 29 plus corner	17.5 feet	17.5 feet	15 feet	2.5 feet
30 - 33	17.5 feet	17.5 feet	16 feet	1.5 feet
34	17.5 feet	17.5 feet	15 feet	2.5 feet
35 - 39	17.5 feet	18 feet	15 feet	3 feet
40 – 41	17.5 feet	18 feet	15 feet	3 feet
42 – 57 feet	17.5 feet	18.33 feet	15.5 feet	2.83 feet
58 – 60 plus corner	17.5 feet	18.33 feet	15.5 feet	2.83 feet

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION SECTIONS AND DETAILS

FOSTER FW WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JMS
DRAWN: KSK
CHECKED: CTH
APPROVED

SIZE D | SCALE: AS NOTED | DRAWING NO. ED092DT03 | 8/9

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NO	DATE	REVISION	BY	CH	APPROVED
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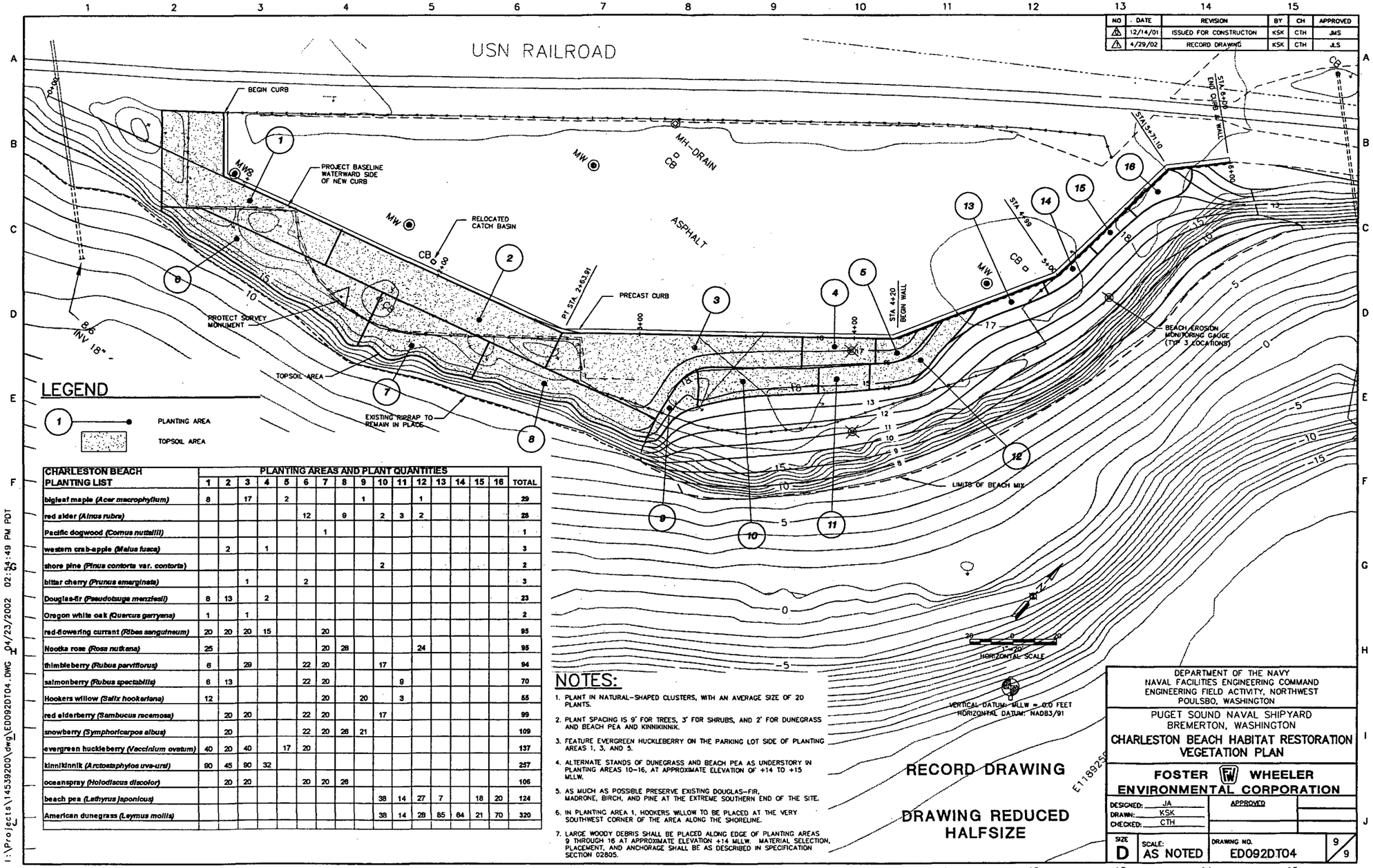
2	4/29/02	RECORD DRAWING	KSK	CTH	JLS



LEGEND

1 — PLANTING AREA

TOPSOIL AREA

CHARLESTON BEACH PLANTING LIST	PLANTING AREAS AND PLANT QUANTITIES																TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
bigleaf maple *(Acer macrophyllum)*	8		17		2				1			1					29
red alder *(Alnus rubra)*						12		9		2	3	2					28
Pacific dogwood *(Cornus nuttallii)*							1										1
western crab-apple *(Malus fusca)*		2		1													3
shore pine *(Pinus contorta var. contorta)*										2							2
bitter cherry *(Prunus emarginata)*			1			2											3
Douglas-fir *(Pseudotsuga menziesii)*	8	13		2													23
Oregon white oak *(Quercus garryana)*	1		1														2
red-flowering currant *(Ribes sanguineum)*	20	20	20	15			20										95
Nootka rose *(Rosa nutkana)*	25						20	28				24					95
thimbleberry *(Rubus parviflorus)*	6		29			22	20			17							94
salmonberry *(Rubus spectabilis)*	6	13				22	20				9						70
Hookers willow *(Salix hookeriana)*	12						20		20		3						55
red elderberry *(Sambucus racemosa)*		20	20			22	20			17							99
snowberry *(Symphoricarpos albus)*		20				22	20	28	21								109
evergreen huckleberry *(Vaccinium ovatum)*	40	20	40		17	20											137
kinnikinnik *(Arctostaphylos uva-ursi)*	80	45	90	32													257
oceanspray *(Holodiscus discolor)*		20	20			20	20	26									106
beach pea *(Lathyrus japonicus)*										38	14	27	7		18	20	124
American dunegrass *(Leymus mollis)*										38	14	28	85	64	21	70	320

NOTES:

1. PLANT IN NATURAL-SHAPED CLUSTERS, WITH AN AVERAGE SIZE OF 20 PLANTS.
2. PLANT SPACING IS 9' FOR TREES, 3' FOR SHRUBS, AND 2' FOR DUNEGRASS AND BEACH PEA AND KINNIKINNIK.
3. FEATURE EVERGREEN HUCKLEBERRY ON THE PARKING LOT SIDE OF PLANTING AREAS 1, 3, AND 5.
4. ALTERNATE STANDS OF DUNEGRASS AND BEACH PEA AS UNDERSTORY IN PLANTING AREAS 10-16, AT APPROXIMATE ELEVATION OF +14 TO +15 MLLW.
5. AS MUCH AS POSSIBLE PRESERVE EXISTING DOUGLAS-FIR, MADRONE, BIRCH, AND PINE AT THE EXTREME SOUTHERN END OF THE SITE.
6. IN PLANTING AREA 1, HOOKERS WILLOW TO BE PLACED AT THE VERY SOUTHWEST CORNER OF THE AREA ALONG THE SHORELINE.
7. LARGE WOODY DEBRIS SHALL BE PLACED ALONG EDGE OF PLANTING AREAS 9 THROUGH 16 AT APPROXIMATE ELEVATION +14 MLLW. MATERIAL SELECTION, PLACEMENT, AND ANCHORAGE SHALL BE AS DESCRIBED IN SPECIFICATION SECTION 02805.

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY, NORTHWEST
POULSBO, WASHINGTON

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

CHARLESTON BEACH HABITAT RESTORATION VEGETATION PLAN

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DESIGNED: JA	APPROVED	
DRAWN: KSK		
CHECKED: CTH		

SIZE	SCALE:	DRAWING NO.	
D	AS NOTED	ED092DT04	9/9

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APPENDIX B

PHOTOGRAPHS

Looking at southwestern corner of bluff, 30 July 2007.

Looking at embankment gauge, 30 July 2007.

Looking at west end of bluff, 30 July 2007.

Looking east at embankment gauge, 30 July 2007.

Looking down at embankment gauge, 30 July 2007.

Looking west at beach, 30 July 2007.

Looking west at erosion gauge along riprap wall, 30 July 2007.

Looking west at upland area, 26 November 2007.

Looking west along upland area, 26 November 2007.

Looking at southwest corner of project site, 26 November 2007.

Looking at west side of bluff with wood debris on beach, 26 November 2007.

Looking at embankment gauge and root wad at east end of site, 26 November 2007.

Looking southwest at debris on beach with beach erosion gauge visible, 27 November 2007.

Erosion around embankment gauge, 27 November 2007.

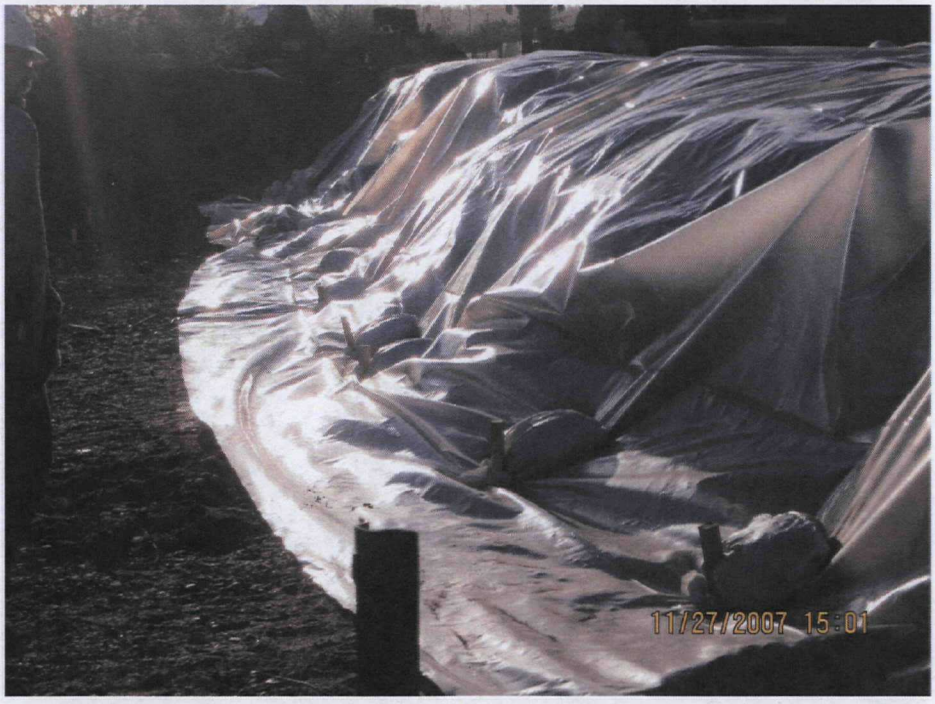
Construction of import material cribs with Ecology Blocks, 27 November 2007.

Temporary on-site facilities, 27 November 2007.

Placement of armor rock into cribs, 27 November 2007.

Start of vegetation removal, 27 November 2007.

Installation of erosion controls, 27 November 2007.



Secured sandbags at toe of bluff, 27 November 2007.

Start of excavation in southwestern corner of beach, 28 November 2007.

Excavation in southwestern corner of beach at shutdown, 28 November 2007.

Surveying in toe of armor rock wall, 28 November 2007.

Heavy rains, 3 December 2007.

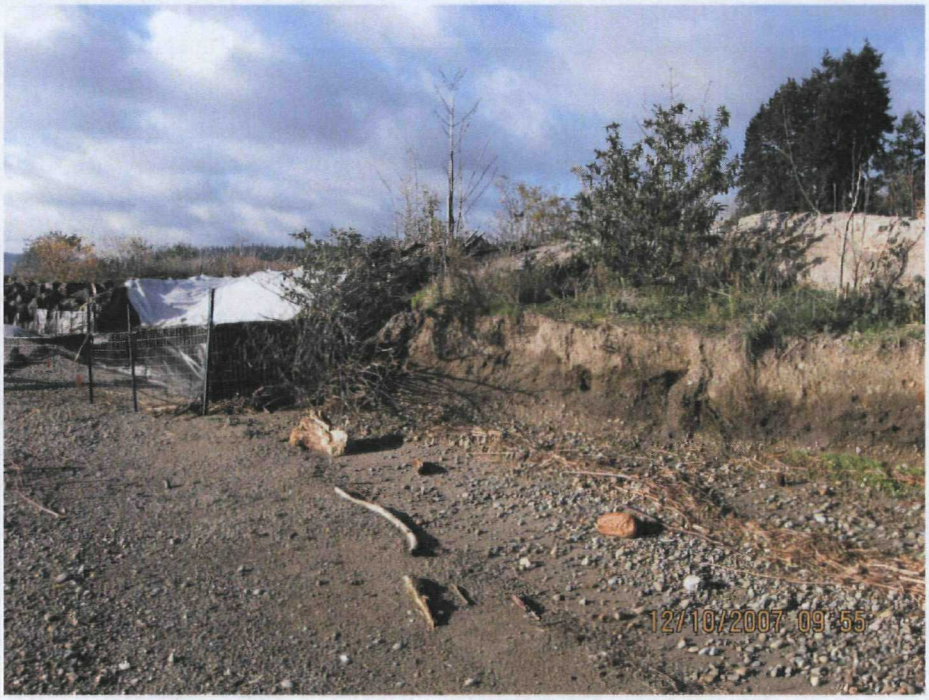
Heavy rains and high tide, 3 December 2007.

Covered filter rock piles and waste containers, 3 December 2007.

Damaged silt fence from storm, 3 December 2007.

Repair of silt fence after storm, 3 December 2007.

Project site, 7 December 2007.



Silt fence damage and bluff at east end of project site, 10 December 2007.

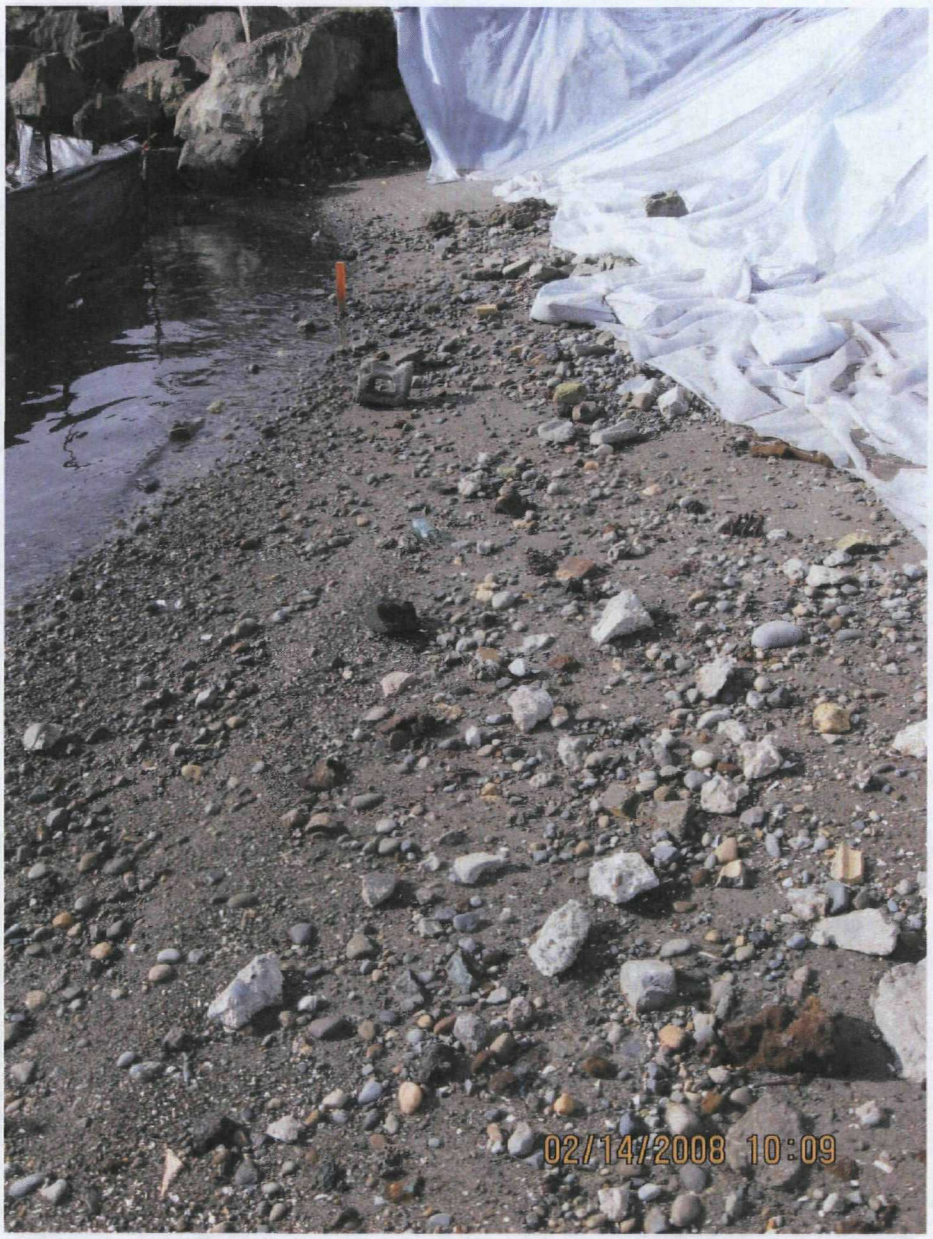
Debris becoming visible on beach, 24 January 2008.

Silt fence prior to relocation, 14 February 2008.

Shoreline slough contained by plastic sheeting, 14 February 2008.

Securing of plastic sheeting along toe of bluff, 14 February 2008.

Looking west at silt fence and eroding bluff from east side, 14 February 2008.



Debris becoming visible on beach in southwest corner, 14 February 2008.

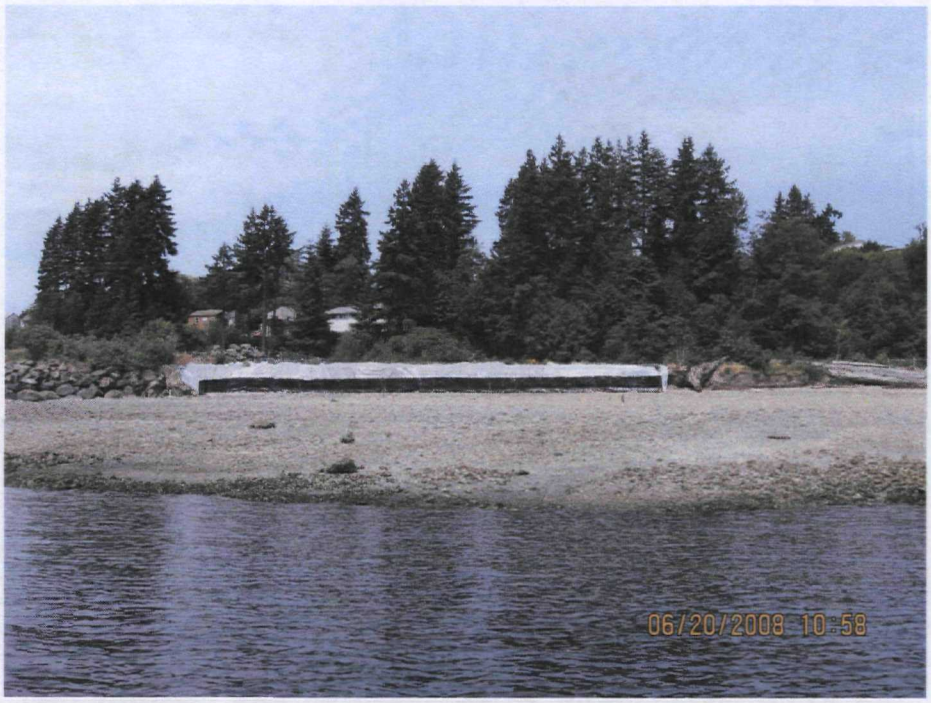
Close-up of debris in southwest corner, 14 February 2008.

Debris picked up from in front of bluff prior to silt fence relocation, 14 February 2008.

Relocation of silt fence to minimize fish entrapment, 14 February 2008.

Looking west after complete relocation of silt fence to minimize fish entrapment, 14 February 2008.

Silt fence after relocation to minimize fish entrapment, 14 February 2008.



Looking at face of shoreline, 20 June 2008.

Shoreline sloughing contained by plastic sheeting, 23 June 2008.

Looking west at silt fence and eroding bluff at east end of site, 23 June 2008.

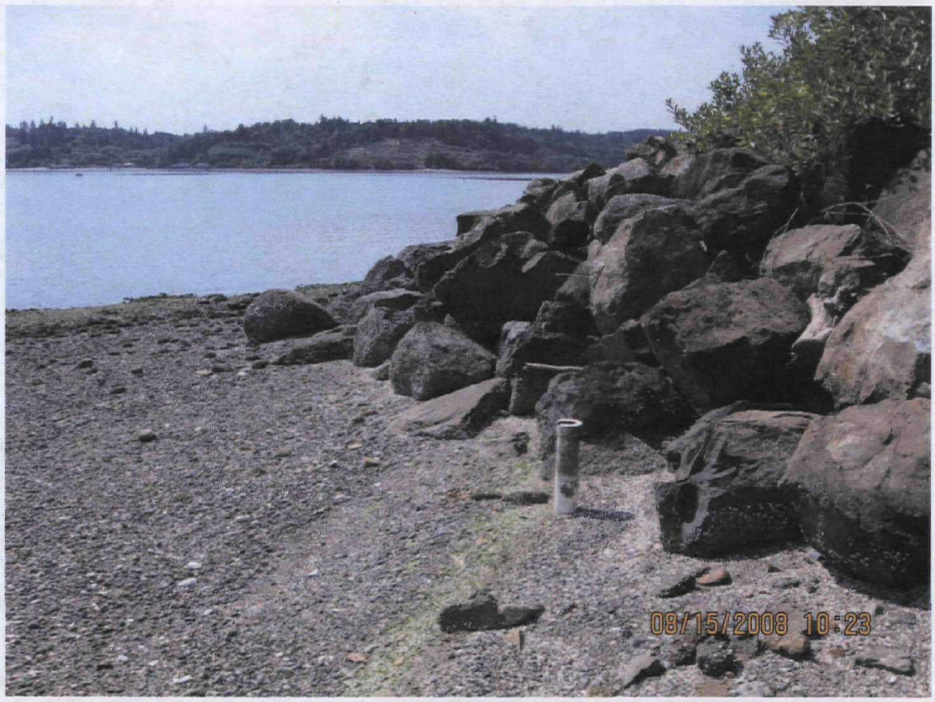
Tear in plastic near east end of site, 23 June 2008.

Undermining of bluff at east end of site, 23 June 2008.

Plastic sheeting secured over upland area, 23 June 2008.

Looking toward east end of beach with beach erosion gauge visible, 15 August 2008.

Looking toward west end of beach with beach erosion gauge visible, 15 August 2008.



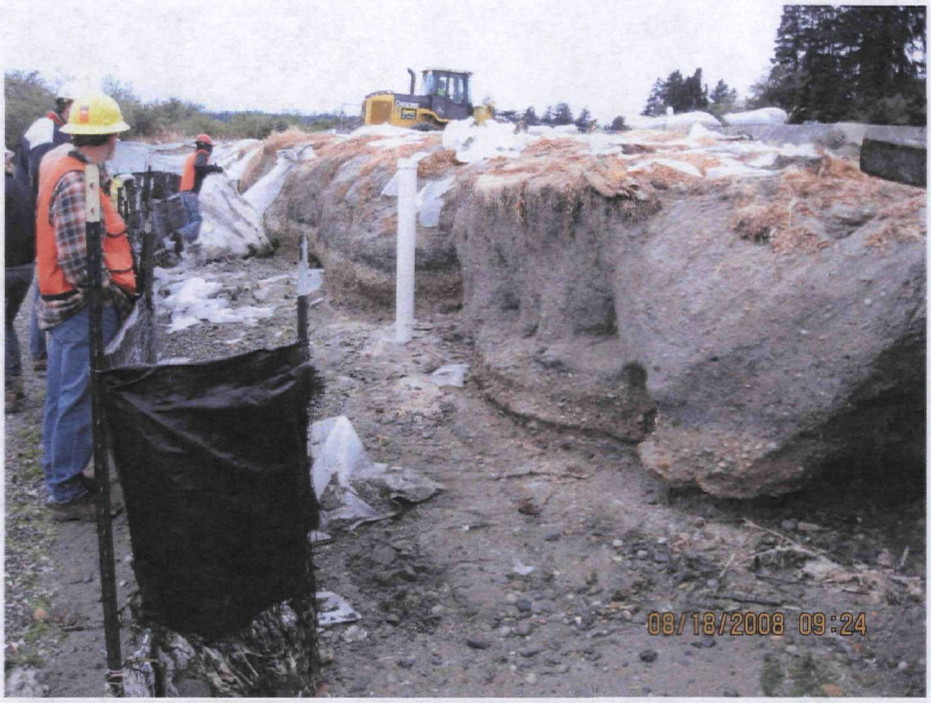
Looking at erosion gauge adjacent to riprap wall, prior to removal, 15 August 2008.

Looking at erosion adjacent to woody debris at east end of site, 15 August 2008.

Looking at woody debris and bluff just east of project site, 15 August 2008.

Debris pile located east of project site, upland from beach, 15 August 2008.

Looking west at project site, prior to plastic removal, 15 August 2008.



Looking west along shoreline during plastic removal, 18 August 2008.

Eroded bluff with debris present on beach, 18 August 2008.

Close-up of eroded bluff and fill material in southwestern corner of site, 18 August 2008.

Looking east along eroded bluff, 18 August 2008.

Looking west along toe of eroded bluff, 18 August 2008.

Recovering site at end of day, 18 August 2008.

View of eroded bluff prior to rock placement, 19 August 2008.

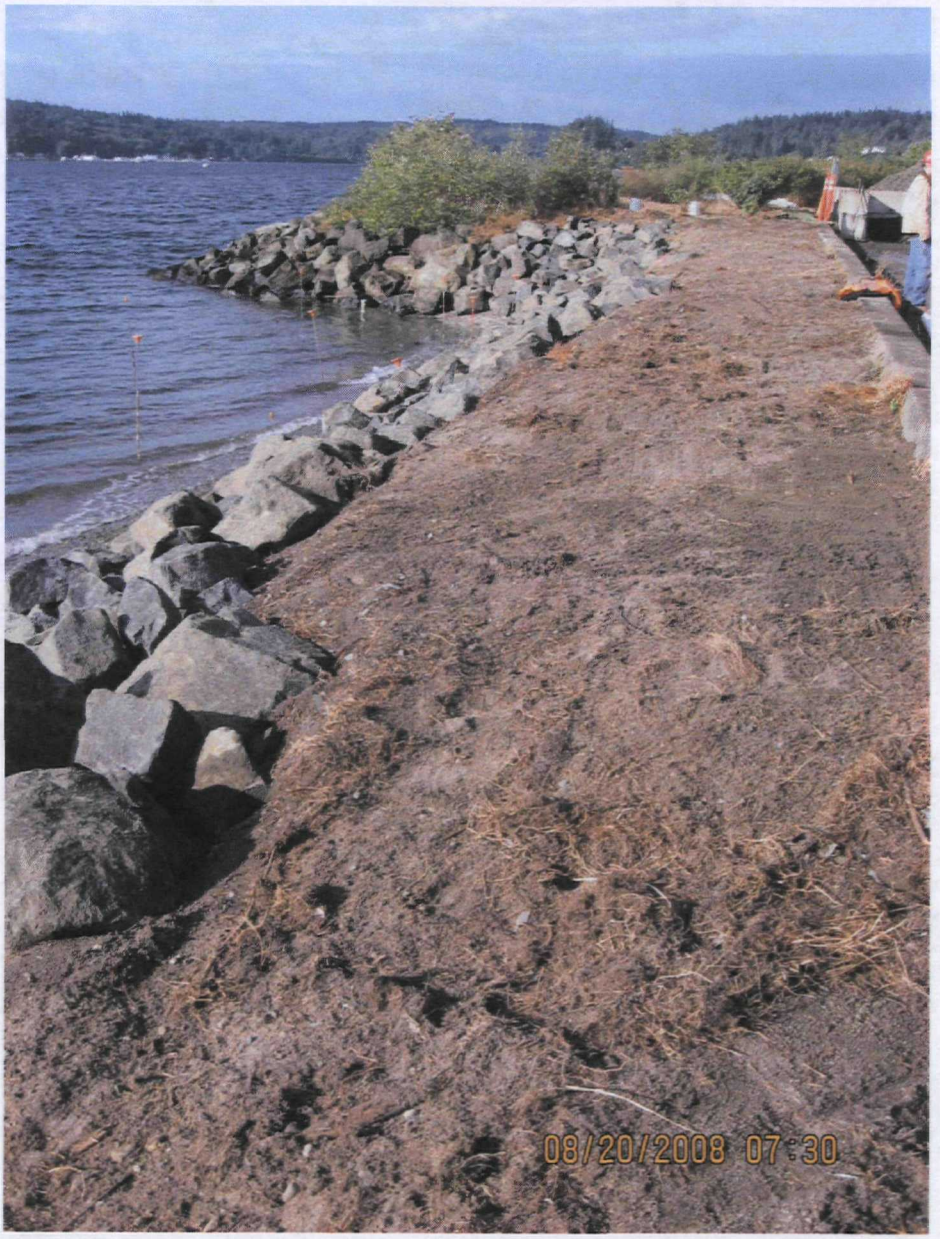
Offloading of fish mix material, 19 August 2008.

Start of armor rock placement in southwestern corner of project site, 19 August 2008.

Armor rock placement along eastern end of project site, 19 August 2008.

Excess filter rock placed into Navy railcar, 19 August 2008.

Attempt to locate eastern most erosion gauge, 19 August 2008.



Completed rock wall, prior to fish mix placement, 20 August 2008.

Completed rock wall and start of fish mix placement, 20 August 2008.

Fish mix placement, 20 August 2008.

Fish mix placement at east end of site, 20 August 2008.

Loading of fish mix into shooter truck, 20 August 2008.

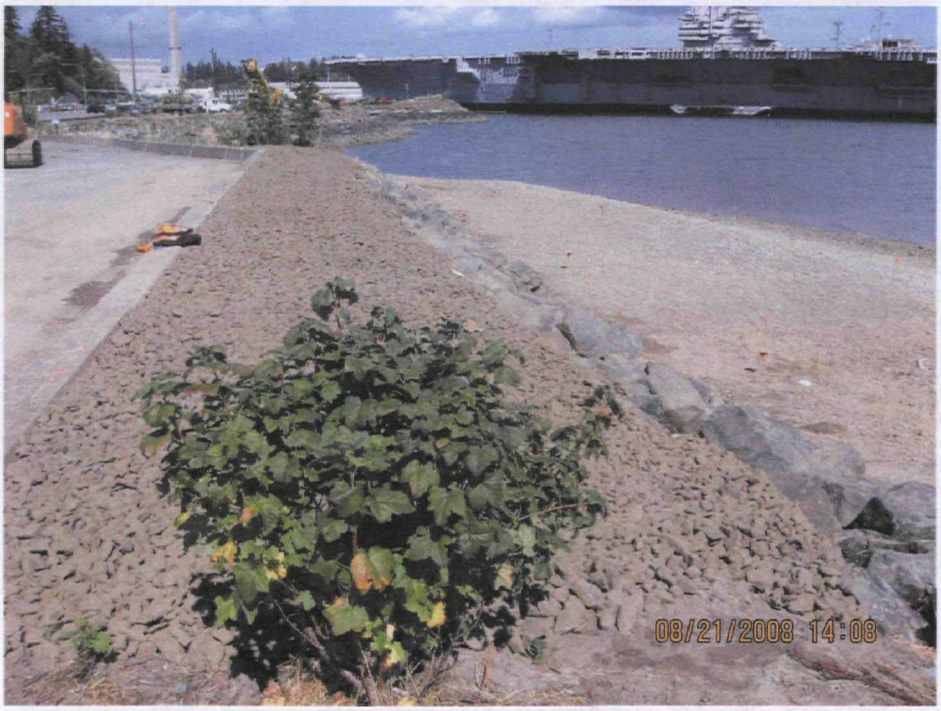
Initial grading of topsoil, 21 August 2008.

Final grading of topsoil prior to placement of geotextile, 21 August 2008.

Placement of geotextile, 21 August 2008.

Placement of filter rock over geotextile, 21 August 2008.

Compaction of filter rock, 21 August 2008.



Looking east along completed upland area, 21 August 2008.

Looking west at project site, 21 August 2008.

Looking at western end of armor rock wall, 21 August 2008.

Looking west along beach with beach erosion gauge visible, 21 August 2008.

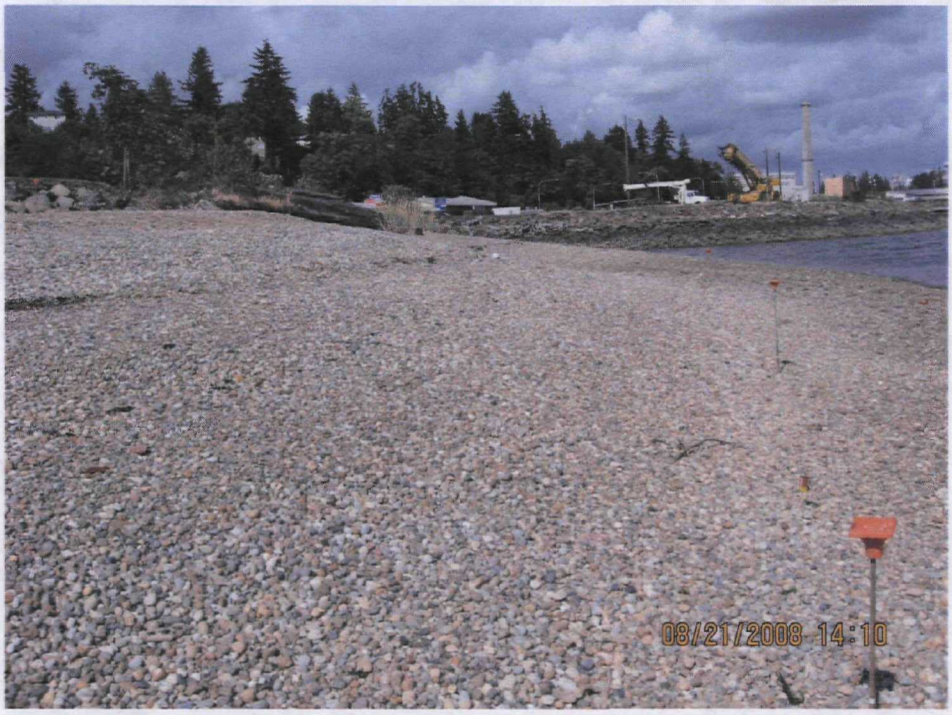
Looking west along beach with new erosion gauge installed at east end of site, 21 August 2008.

Looking east along beach with new erosion gauge installed at west end of site, 21 August 2008.

Looking at eastern end of site at transition between armor rock and root wad, 21 August 2008.

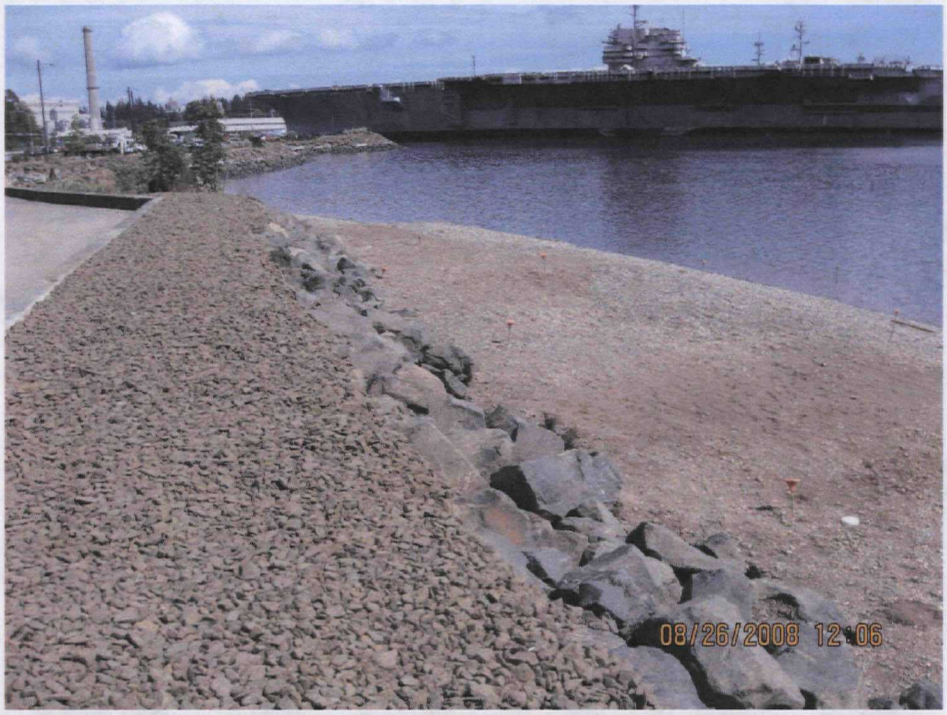
Looking east along beach, 21 August 2008.

Looking at eastern end of site with beach erosion gauge visible, 21 August 2008.

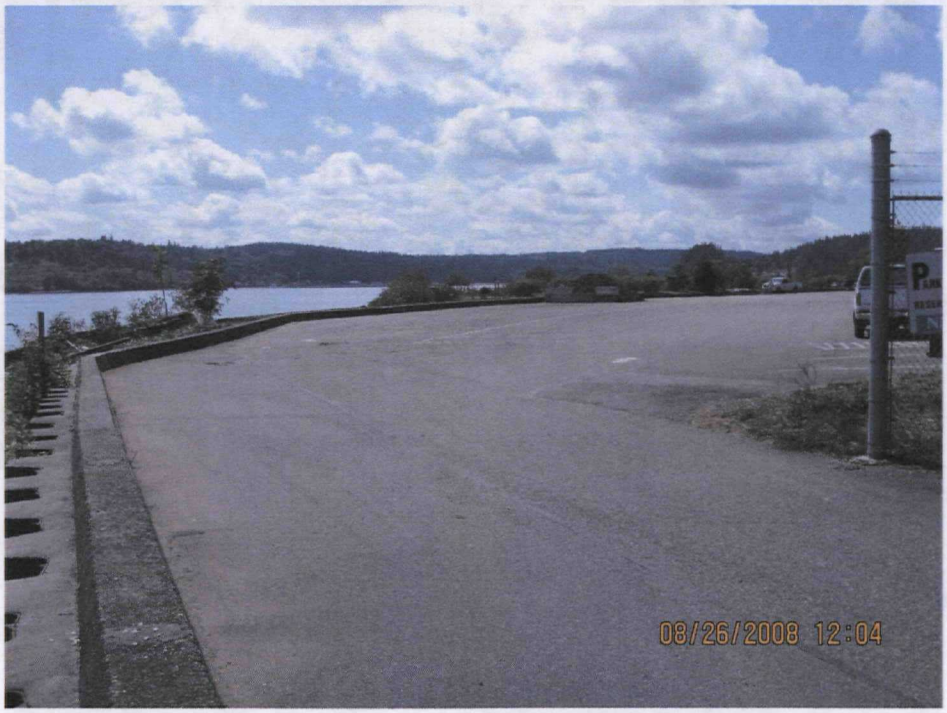


Looking at eastern end of site with beach erosion gauge visible, 21 August 2008.

Looking west at project site after project completion, 26 August 2008.



Looking east at project site after project completion, 26 August 2008.



Looking at cleaned parking lot after project completion, 26 August 2008.

Looking at reinstalled "Habitat Restoration" sign west of site, 26 August 2008.

APPENDIX C

RECORD DRAWINGS

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON
TASK ORDER NO. 31
POST CONSTRUCTION DRAWINGS
CONTRACT # N68711-04-D-1104

DRAWING NUMBER	TITLE	TOTAL SHEETS	REVISION
0031-COMP-REC	OUA CHARLESTON BEACH EXISTING CONDITIONS	1	B
0031-ETB-REC	OUA CHARLESTON BEACH BLUFF TOE EROSION	1	B
0031-GP-REC R1	OUA CHARLESTON BEACH POST CONSTRUCTION PLAN VIEW	1	B
0031-XS-REC	OUA CHARLESTON BEACH COMPARISON OF SURFACE ELEVATIONS	8	B
0031-XS-TYP	OUA CHARLESTON BEACH POST CONSTRUCTION TYPICAL CROSS SECTION	1	B

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
TITLE SHEET AND DRAWING LIST

SES-TECH

DESIGNED: ELR
DRAWN: AAS
CHECKED: SO

APPROVED
SM

SIZE: D
SCALE: NA
DRAWING NO. 0031-INX-REC R1
1 / 1

P:\2973 CHARLESTON BEACH\CAD\RECORD DRAWINGS\REV B\0031-INX-REC R1.DWG
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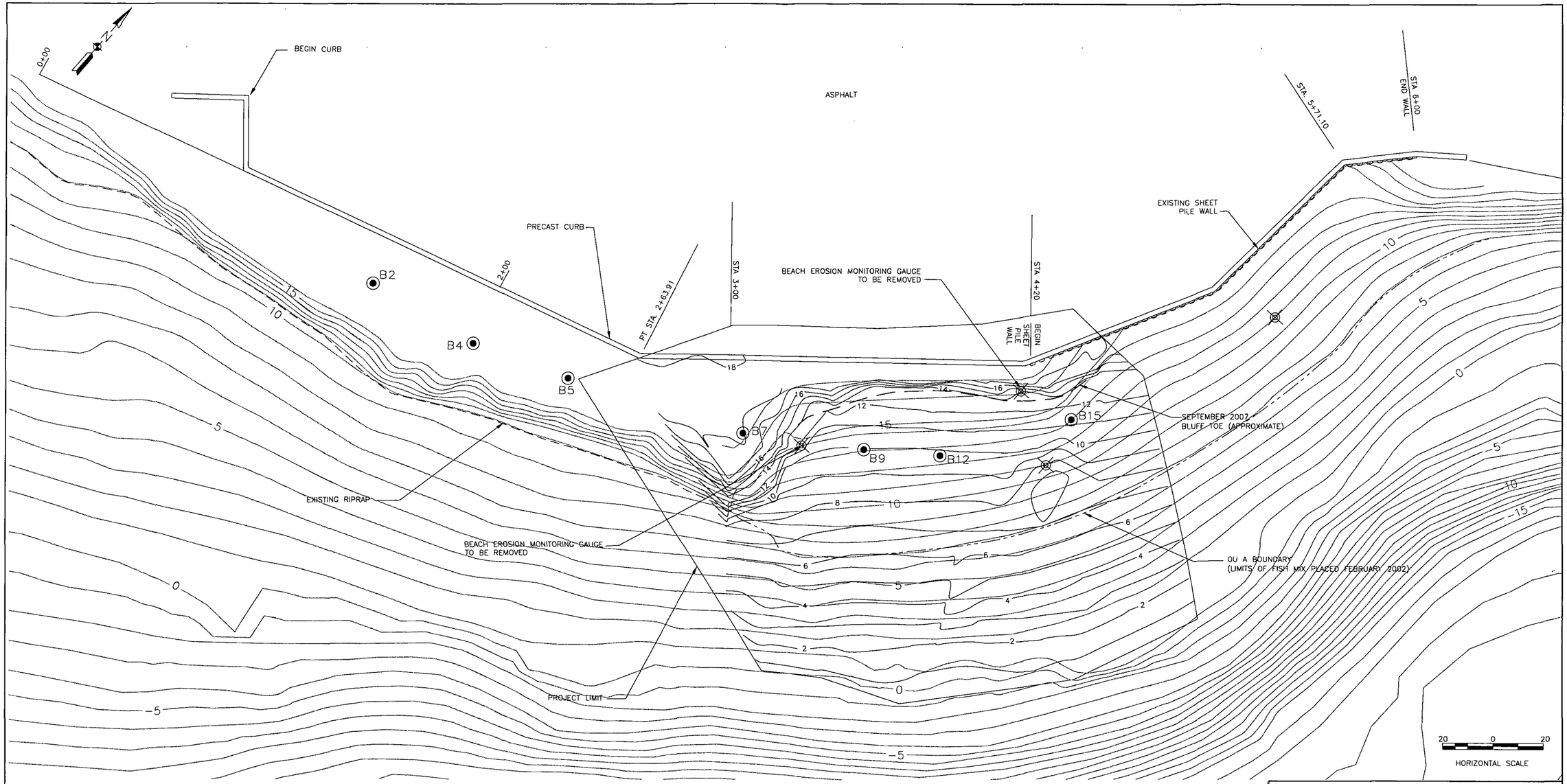

LEGEND:

- BEACH EROSION MONITORING GAUGE
- CONTOUR LINES AS OF SEPTEMBER 2007
- EXISTING RIPRAP
- B2 EXCAVATED SOIL AND EXPOSED FILL STATION LOCATIONS
- CONTOUR LINES AS OF APRIL 2002
- OU A BOUNDARY

NOTES:

1. TOPOGRAPHIC SURVEY CONDUCTED BY SES-TECH ON SEPTEMBER 10, 2007.
2. CONTOUR LINES FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).

BREMERTON TIDE DATA	
TIDE DATUM	ELEVATION (FT)
EXTREME HIGH WATER (EHW)	14.67*
MEAN HIGHER HIGH WATER (MHHW)	11.74**
MEAN LOWER LOW WATER (MLLW)	0**
*TIDAL DATA OBTAINED FROM U.S. ARMY CORPS OF ENGINEERS OFFICE AND NAUTICAL SOFTWARE.	
** NOAA STATION ID 9445958, TIDAL EPOCH: 1983-2001	

BASELINE COORDINATES AND BEARINGS	
STATION 0+00	N 206386.79 E 1188674.86
STATION 0+00 TO STATION 2+63.91	N 74°01'52"E
STATION 2+63.91 TO STATION 4+20	N 50°00'26"E

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED
HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON
OUA CHARLESTON BEACH
EXISTING CONDITIONS
AS OF SEPTEMBER 10, 2007

SES-TECH

DESIGNED: ELR	APPROVED		
DRAWN: AAS	SM		
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-COMP-REC	1/1

P:\2973 CHARLESTON BEACH\CAD\RECORD DRAWINGS\REV B\0031-COMP-REC.DWG
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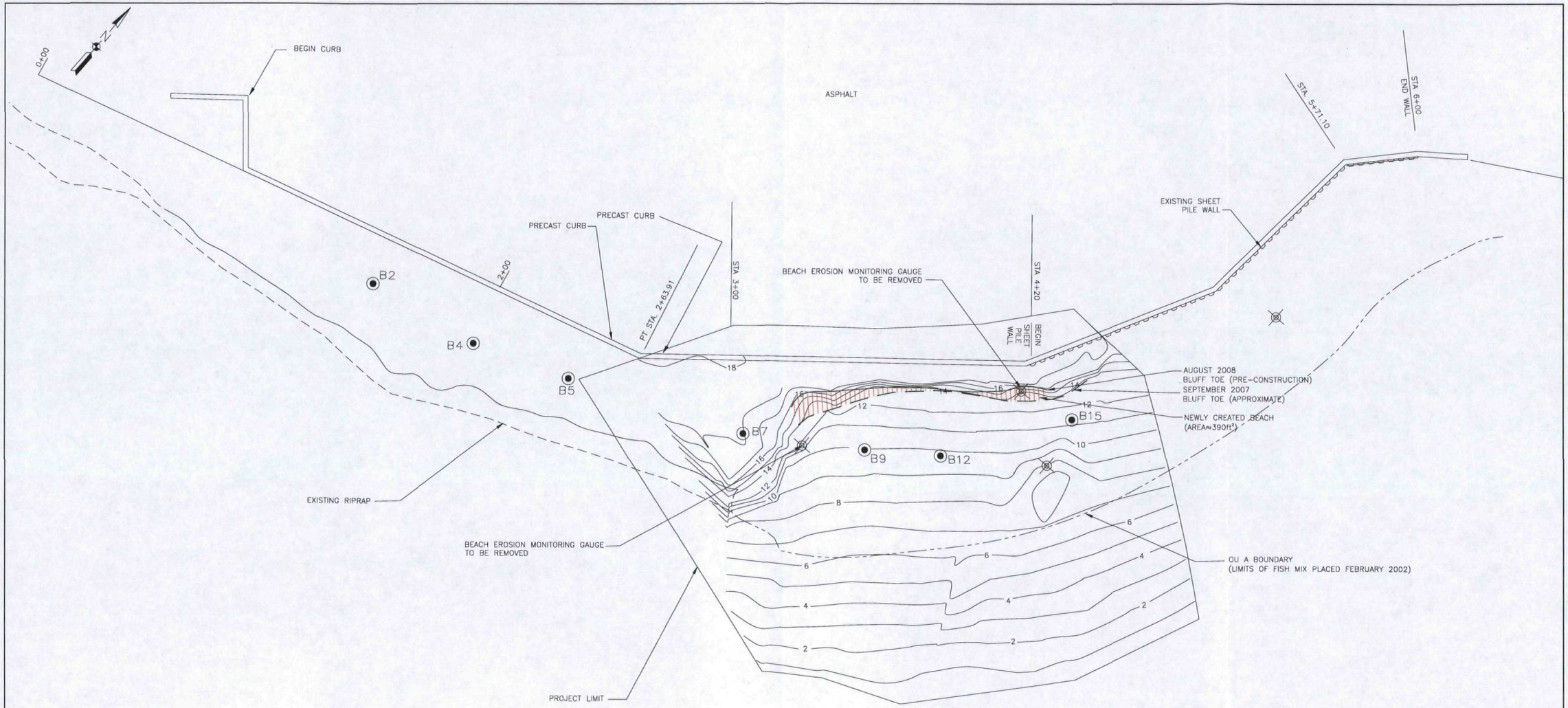

20 0 20

HORIZONTAL SCALE

LEGEND:

- BEACH EROSION MONITORING GAUGE
- CONTOUR LINES AS OF SEPTEMBER 2007
- EXISTING RIPRAP
- B2 EXCAVATED SOIL AND EXPOSED FILL STATION LOCATIONS
- OU A BOUNDARY
- BLUFF TOE EROSION FROM SEPTEMBER 10, 2007 TO AUGUST 19, 2008

NOTES:

1. TOPOGRAPHIC SURVEYS CONDUCTED BY SES-TECH ON SEPTEMBER 10, 2007 AND AUGUST 18-19, 2008.

BREMERTON TIDE DATA	
TIDE DATUM	ELEVATION (FT)
EXTREME HIGH WATER (EHW)	14.67*
MEAN HIGHER HIGH WATER (MHHW)	11.74**
MEAN LOWER LOW WATER (MLLW)	0**
*TIDAL DATA OBTAINED FROM U.S. ARMY CORPS OF ENGINEERS OFFICE AND NAUTICAL SOFTWARE.	
** NOAA STATION ID 9445958, TIDAL EPOCH: 1983-2001	

BASELINE COORDINATES AND BEARINGS	
STATION 0+00	N 206386.79 E 1188674.86
STATION 0+00 TO STATION 2+63.91	N 74°01'52"E
STATION 2+63.91 TO STATION 4+20	N 50°00'26"E

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON
OUA CHARLESTON BEACH
BLUFF TOE EROSION
FROM SEPTEMBER 10, 2007 TO AUGUST 19, 2008

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-ETB-REC	1/1

P:\2973 CHARLESTON BEACH\CAD\RECORD DRAWINGS\REV B\0031-ETB-REC.DWG
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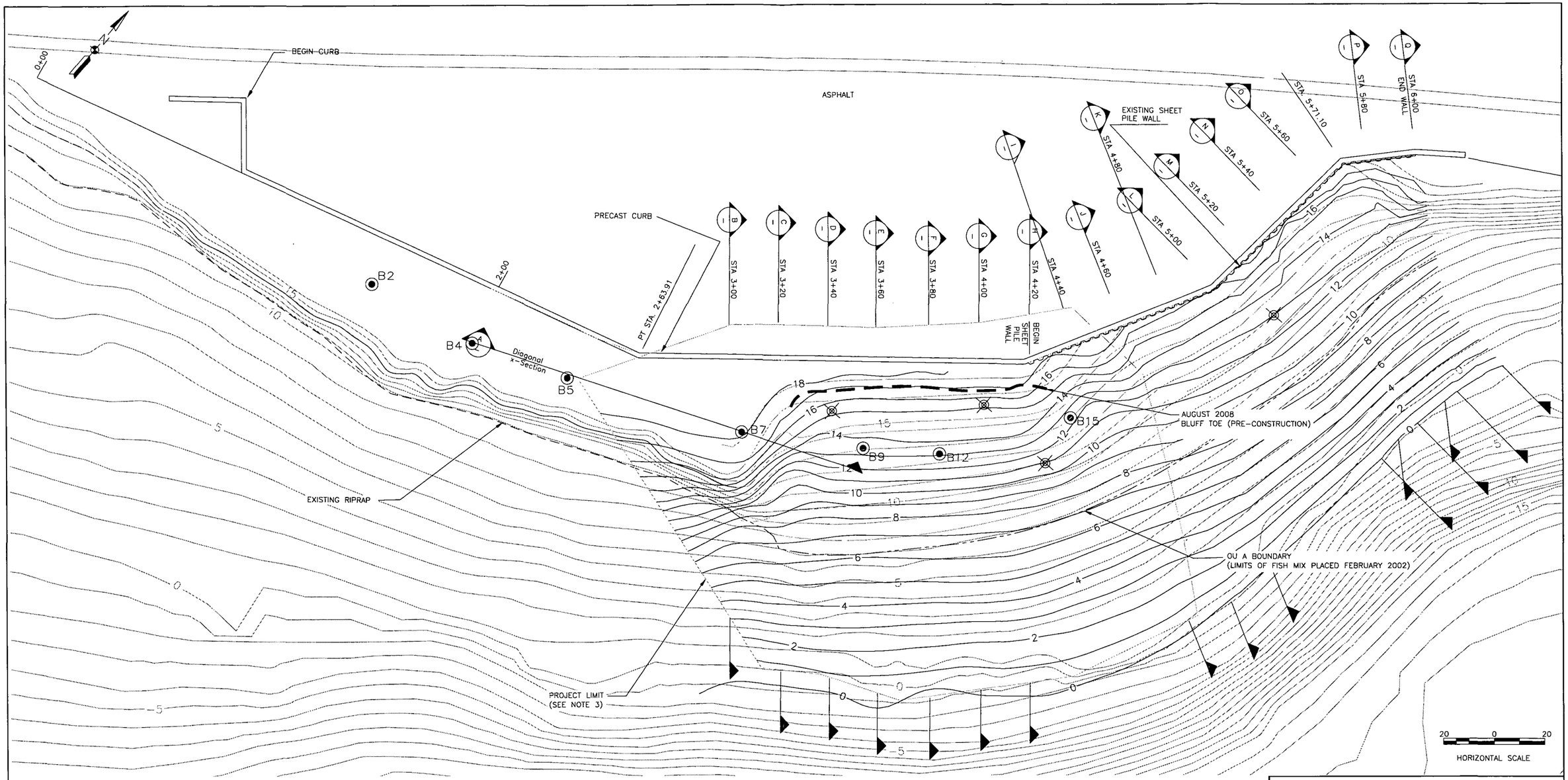

LEGEND:

- BEACH EROSION MONITORING GAUGE
- SECTION A 0,0 CROSS SECTION LOCATION
- CONTOUR LINES AS OF AUGUST 28, 2008
- EXISTING RIPRAP
- B2 EXCAVATED SOIL AND EXPOSED FILL STATION LOCATIONS
- CONTOUR LINES AS OF APRIL 2002
- OU A BOUNDARY
- AUGUST 2008 BLUFF TOE (PRE-CONSTRUCTION)

NOTES:

1. TOPOGRAPHIC SURVEY CONDUCTED BY SES-TECH ON AUGUST 27-28, 2008.
2. CONTOUR LINES FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).
3. SEE DRAWING 0031-XS-TYP FOR TYPICAL CROSS SECTION OF ARMOR ROCK AND FISH MIX PLACEMENT IN AUGUST 2008.
4. BEACH EROSION MONITORING GAUGES FABRICATED FROM CONCRETE-FILLED 4" PVC PIPE. GAUGE AT STA 3+40 EXTENDED TO 4.8' ABOVE AUGUST 19, 2008 SURFACE ELEVATION (+10.6 FEET MLLW). GAUGE AT STA 4+00 EXTENDED TO 2' ABOVE AUGUST 19, 2008 SURFACE ELEVATION (+13.3 FEET MLLW). GAUGE AT STA 4+20 EXTENDED APPROXIMATELY 2.5' ABOVE SEPTEMBER 10, 2007 SURFACE ELEVATION (+8.9 FEET MLLW). GAUGE AT STATION 5+10 IS BURIED APPROXIMATELY 2 FEET BELOW GROUND SURFACE.

BREMERTON TIDE DATA	
TIDE DATUM	ELEVATION (FT)
EXTREME HIGH WATER (EHW)	14.67*
MEAN HIGHER HIGH WATER (MHHW)	11.74**
MEAN LOWER LOW WATER (MLLW)	0**
*TIDAL DATA OBTAINED FROM U.S. ARMY CORPS OF ENGINEERS OFFICE AND NAUTICAL SOFTWARE.	
** NOAA STATION ID 9445958, TIDAL EPOCH: 1983-2001	

BASELINE COORDINATES AND BEARINGS	
STATION 0+00	N 206386.79 E 1188674.86
STATION 0+00 TO STATION 2+63.91	N 74°01'52"E
STATION 2+63.91 TO STATION 4+20	N 50°00'26"E

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
POST CONSTRUCTION PLAN VIEW

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-GP-REC R1	1/1

P:\2973 CHARLESTON BEACH\CAD\RECORD DRAWINGS\REV B\0031-GP-REC R1.DWG
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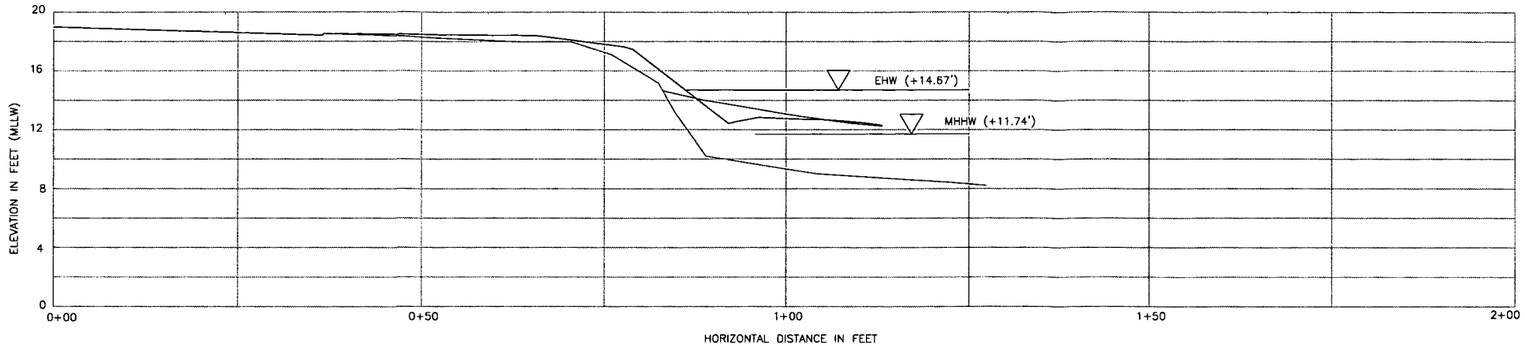
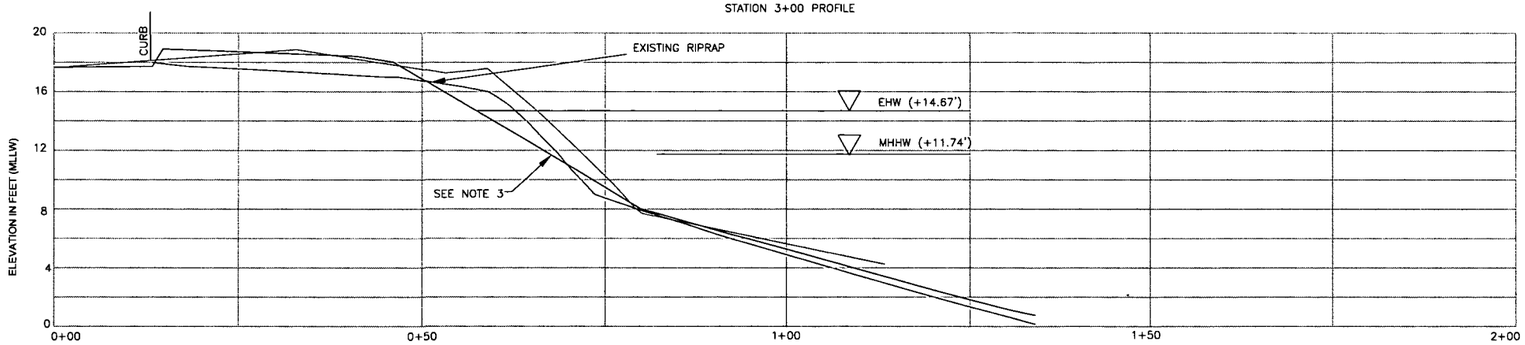
DIAGONAL X_SEC PROFILE



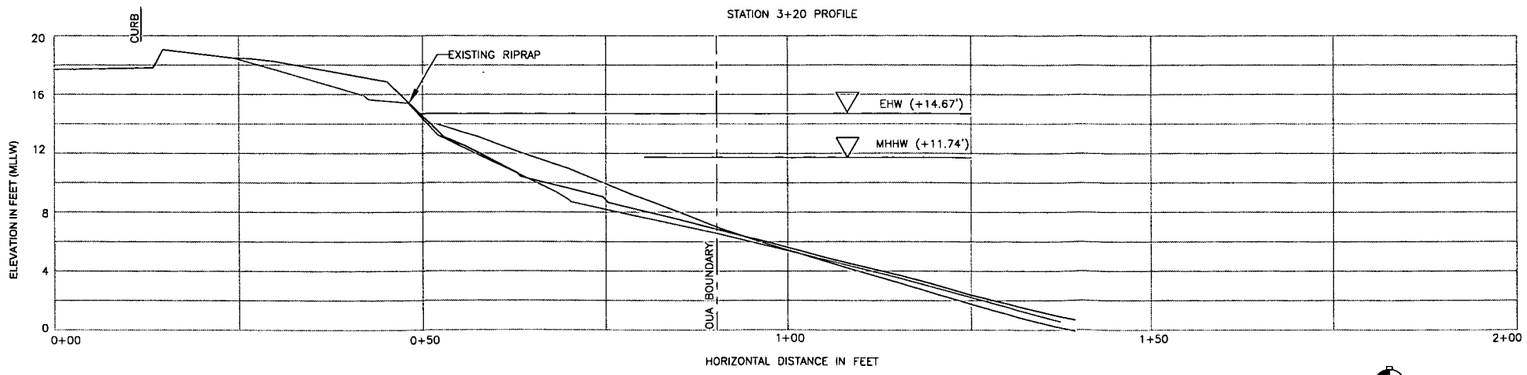
SECTION A/3

STATION 3+00 PROFILE



SECTION B/3

STATION 3+20 PROFILE



SECTION C/3

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

NOTES:

1. TOPOGRAPHIC SURVEYS CONDUCTED BY SES-TECH ON SEPTEMBER 10, 2007 AND AUGUST 27-28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).
3. DEVIATIONS IN CROSS SECTIONS ARE DUE TO IRREGULARITIES IN THE SURFACE OF THE ARMOR ROCK LAYER.

LEGEND:

- SURFACE ELEVATION AS OF APRIL 2002
- SURFACE ELEVATION AS OF SEPTEMBER 10, 2007
- SURFACE ELEVATION AS OF AUGUST 28, 2008

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	1/8

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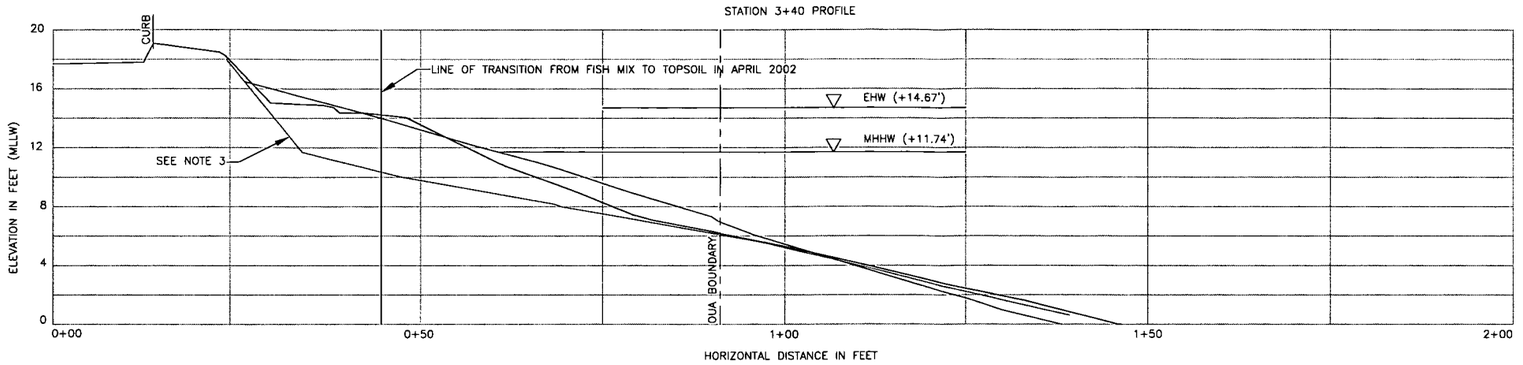
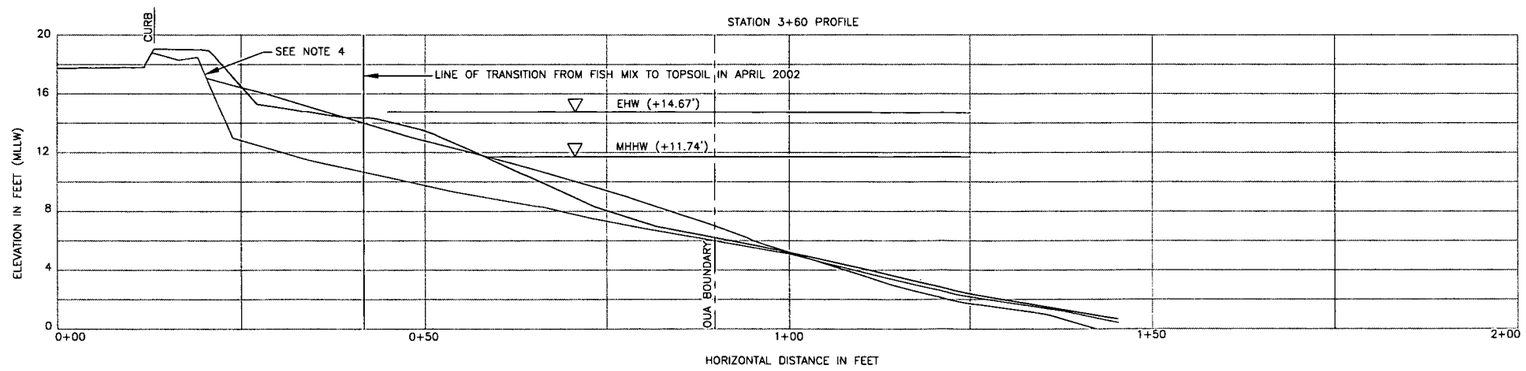


SECTION D/3



SECTION E/3

NOTES:

1. TOPOGRAPHIC SURVEYS CONDUCTED BY SES-TECH ON SEPTEMBER 10, 2007 AND AUGUST 27-28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).
3. TOE OF BLUFF ERODED APPROXIMATELY 8 FEET INTO EMBANKMENT BETWEEN SEPTEMBER 10, 2007 AND AUGUST 19, 2008. ELEVATION OF BLUFF TOE ON AUGUST 19, 2008 WAS APPROXIMATELY 11.55 FEET MLLW.
4. TOE OF BLUFF ERODED APPROXIMATELY 4 FEET INTO EMBANKMENT BETWEEN SEPTEMBER 10, 2007 AND AUGUST 19, 2008. ELEVATION OF BLUFF TOE ON AUGUST 19, 2008 WAS APPROXIMATELY 11.85 FEET MLLW.

LEGEND:

- SURFACE ELEVATION AS OF APRIL 2002
- SURFACE ELEVATION AS OF SEPTEMBER 10, 2007
- SURFACE ELEVATION AS OF AUGUST 28, 2008

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	2/8

P:\2973 CHARLESTON BEACH\CAD\RECORD DRAWINGS\REV B\0031-XS-REC.DWG
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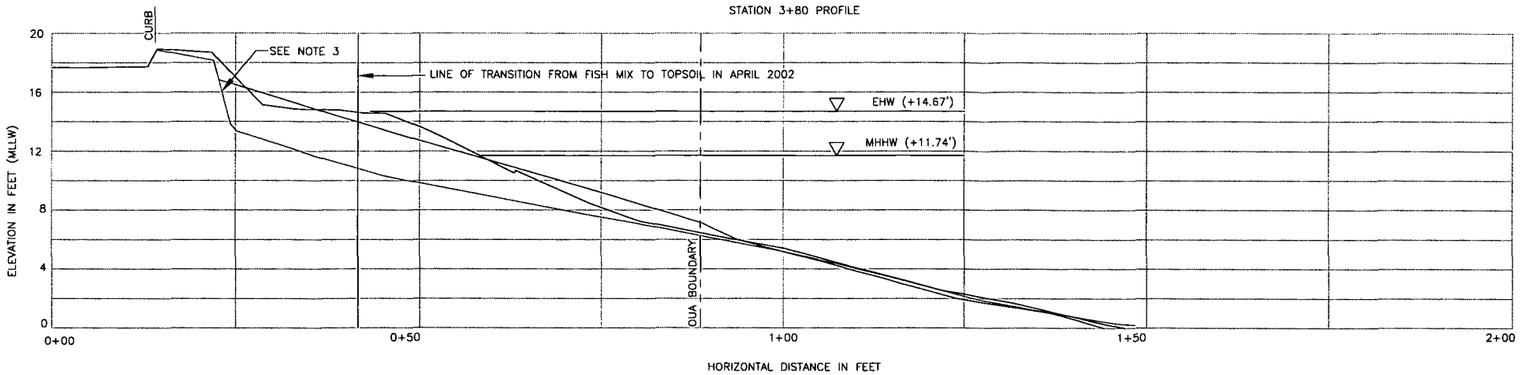
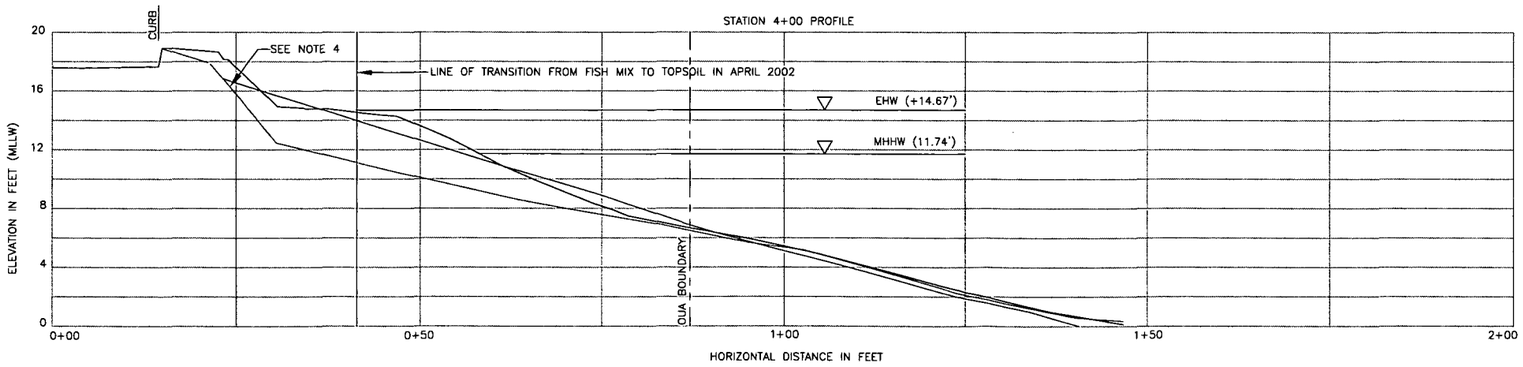


SECTION F/3



SECTION G/3

NOTES:

1. TOPOGRAPHIC SURVEYS CONDUCTED BY SES-TECH ON SEPTEMBER 10, 2007 AND AUGUST 27-28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).
3. TOE OF BLUFF ERODED APPROXIMATELY 3 FEET INTO EMBANKMENT BETWEEN SEPTEMBER 10, 2007 AND AUGUST 19, 2008. ELEVATION OF BLUFF TOE ON AUGUST 19, 2008 WAS APPROXIMATELY 12.45 FEET.
4. TOE OF BLUFF ERODED APPROXIMATELY 6 FEET INTO EMBANKMENT BETWEEN SEPTEMBER 10, 2007 AND AUGUST 19, 2008. ELEVATION OF BLUFF TOE ON AUGUST 19, 2008 WAS APPROXIMATELY 12.80 FEET.

LEGEND:

- SURFACE ELEVATION AS OF APRIL 2002
- SURFACE ELEVATION AS OF SEPTEMBER 10, 2007
- SURFACE ELEVATION AS OF AUGUST 28, 2008

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	3/8

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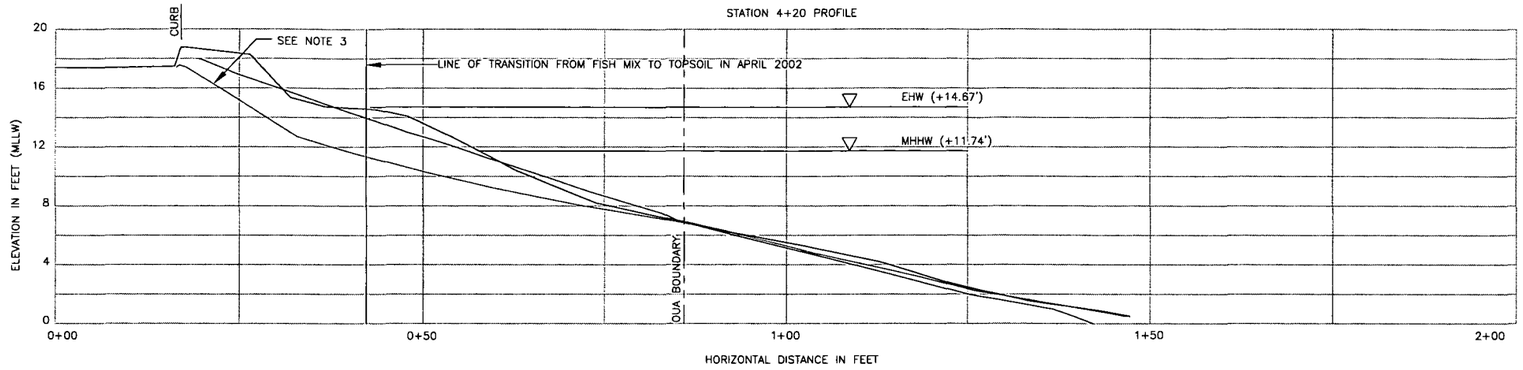
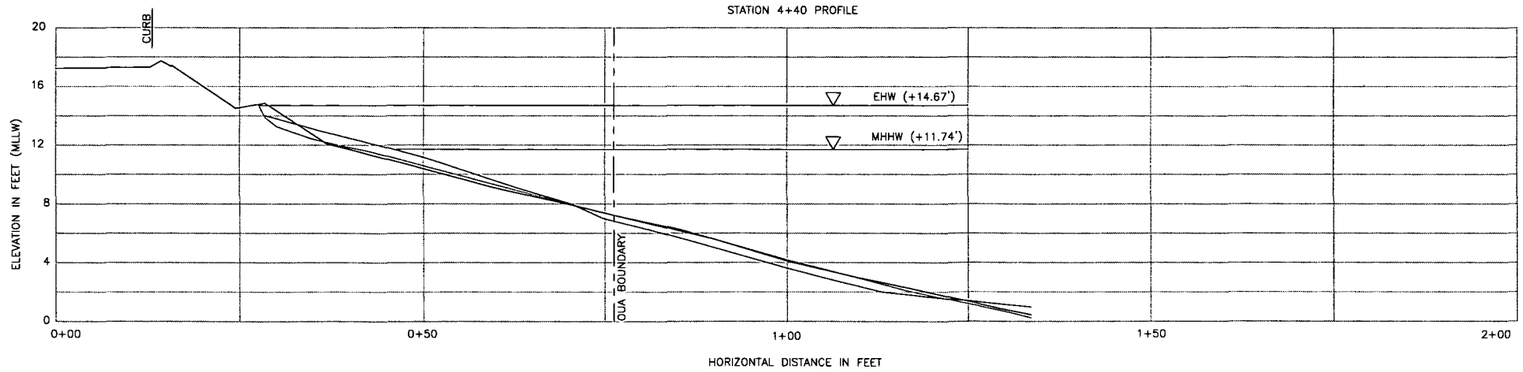


SECTION H 3



SECTION 1 3

NOTES:

1. TOPOGRAPHIC SURVEYS CONDUCTED BY SES-TECH ON SEPTEMBER 10, 2007 AND AUGUST 27-28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).
3. TOE OF BLUFF ERODED APPROXIMATELY 6 FEET BETWEEN SEPTEMBER 10, 2007 AND AUGUST 19, 2008. ELEVATION OF BLUFF TOE ON AUGUST 19, 2008 WAS APPROXIMATELY 12.75 FEET MLLW.

LEGEND:

- SURFACE ELEVATION AS OF APRIL 2002
- SURFACE ELEVATION AS OF SEPTEMBER 10, 2007
- SURFACE ELEVATION AS OF AUGUST 28, 2008

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	4 / 8

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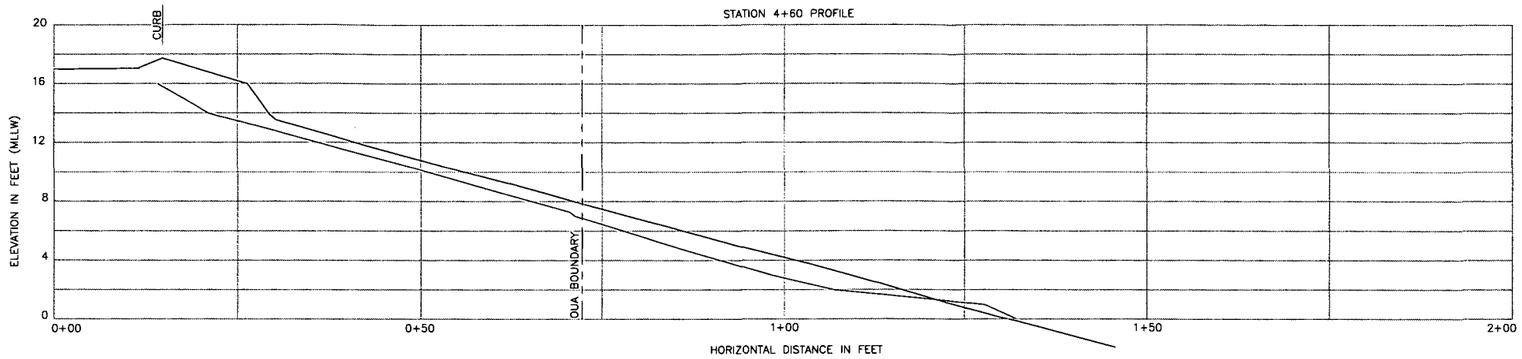


SECTION J/3

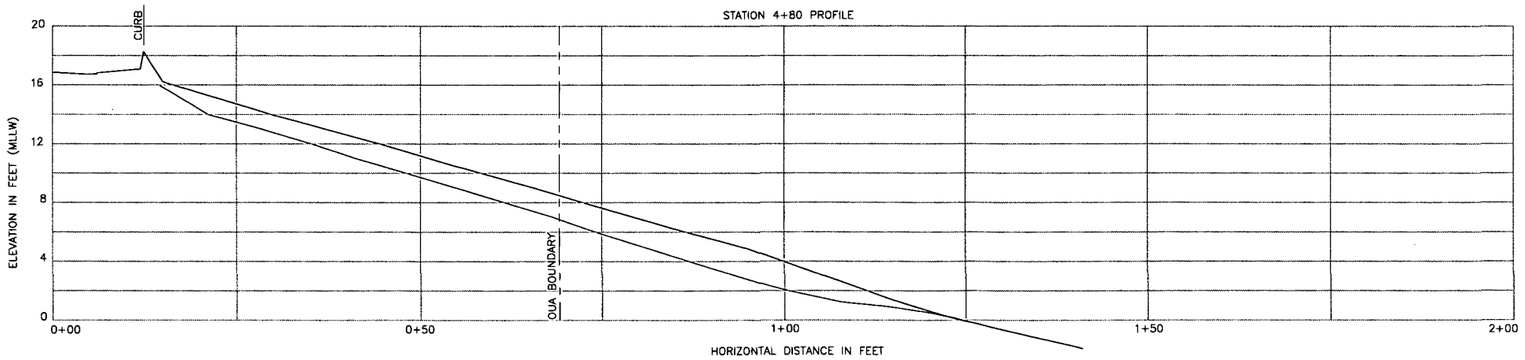
NOTES:

1. TOPOGRAPHIC SURVEY CONDUCTED BY SES-TECH ON AUGUST 27-28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).

LEGEND:

——— SURFACE ELEVATION AS OF APRIL 2002

——— SURFACE ELEVATION AS OF AUGUST 28, 2008



SECTION K/3

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

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NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	5/8

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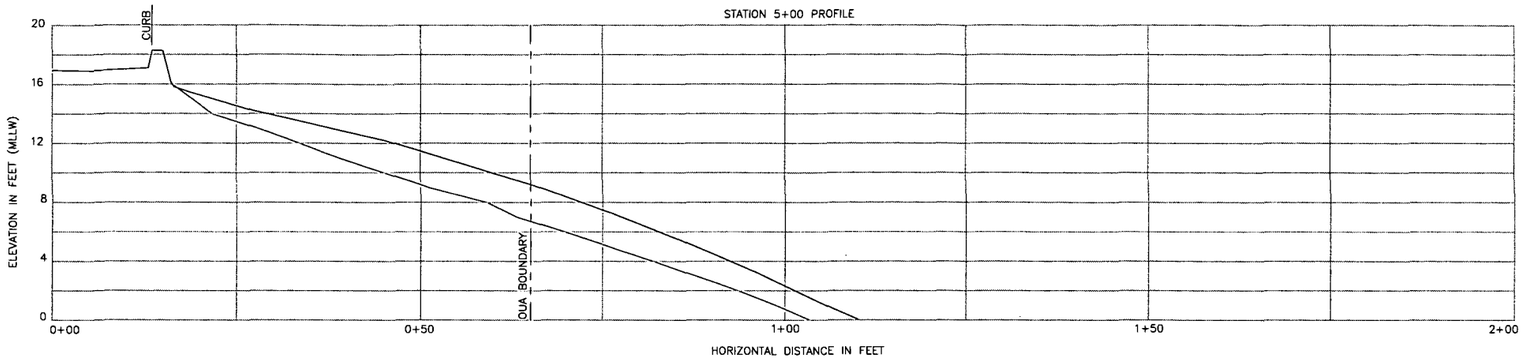
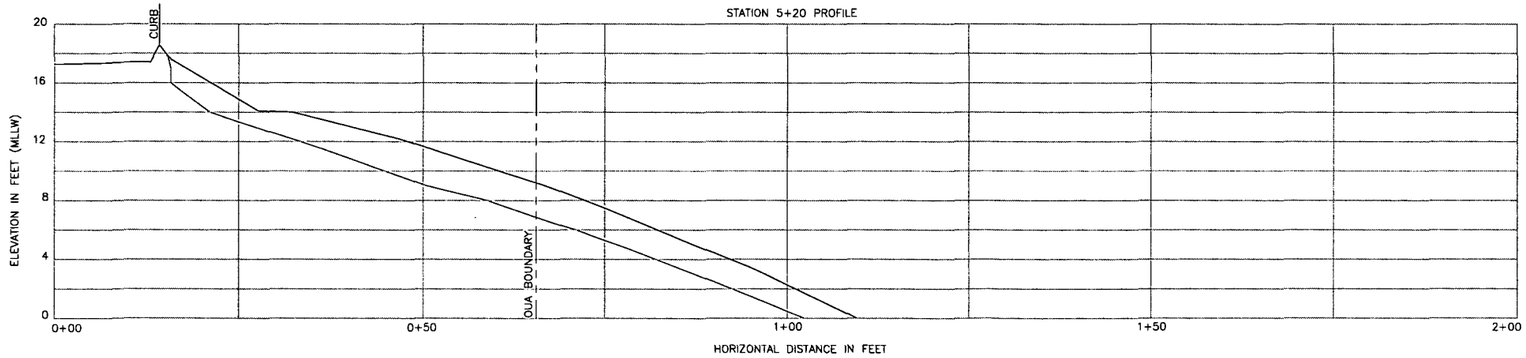


SECTION L/3



SECTION M/3

NOTES:

1. TOPOGRAPHIC SURVEY CONDUCTED BY SES-TECH ON AUGUST 28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).

LEGEND:

——— SURFACE ELEVATION AS OF APRIL 2002

——— SURFACE ELEVATION AS OF AUGUST 28, 2008

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

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NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	6/8

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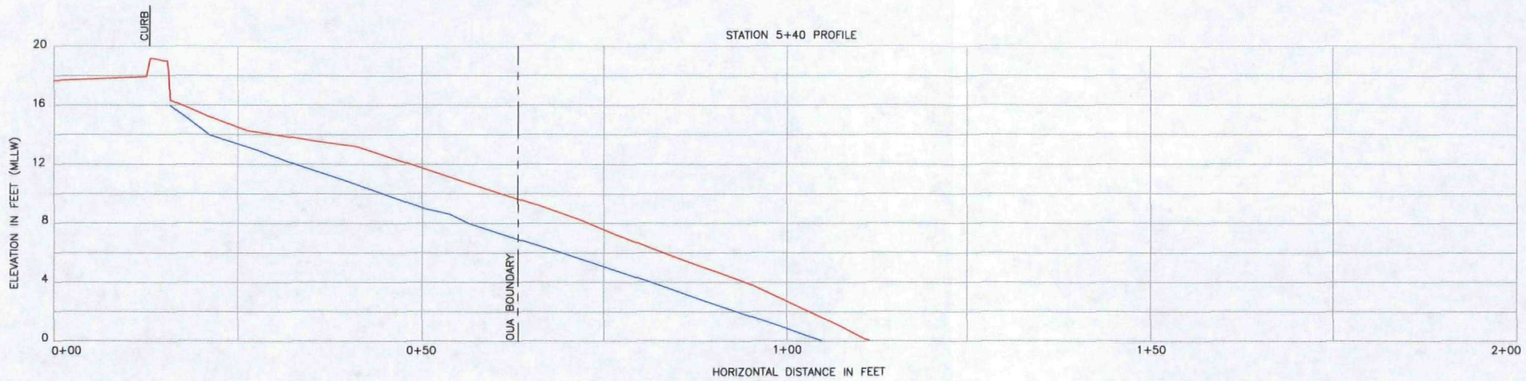


SECTION N/3

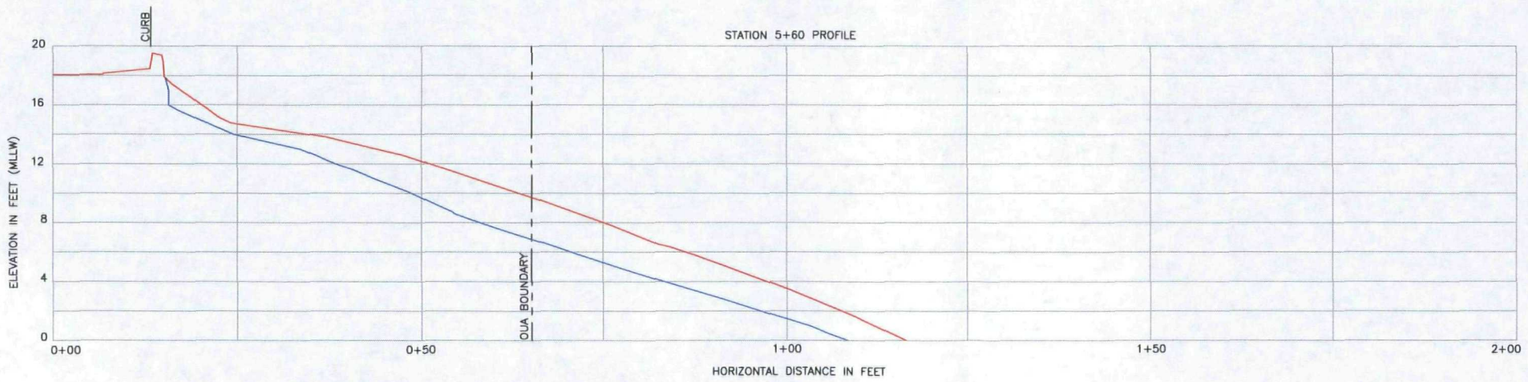
NOTES:

1. TOPOGRAPHIC SURVEY CONDUCTED BY SES-TECH ON AUGUST 28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).

LEGEND:

SURFACE ELEVATION AS OF APRIL 2002

SURFACE ELEVATION AS OF AUGUST 28, 2008



SECTION 0/3

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

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SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	7/8

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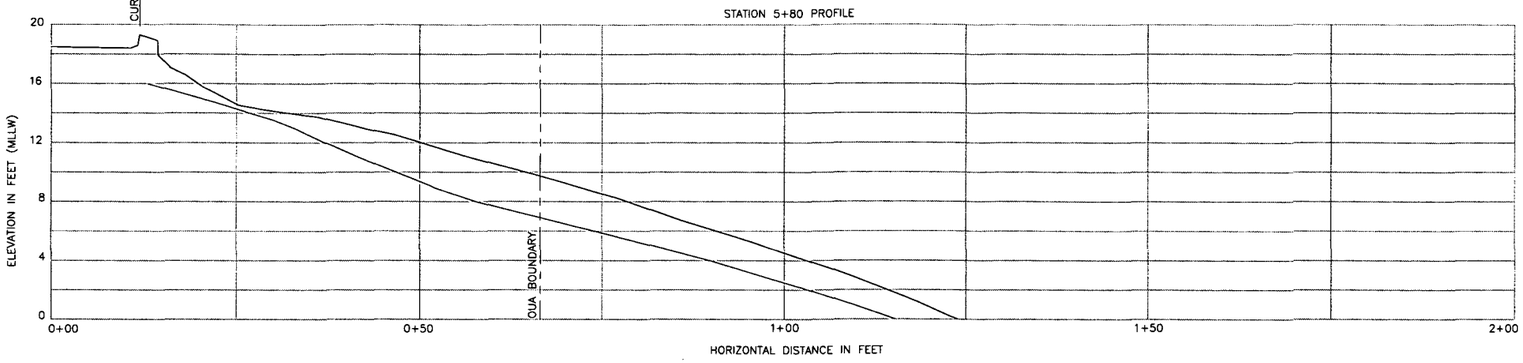
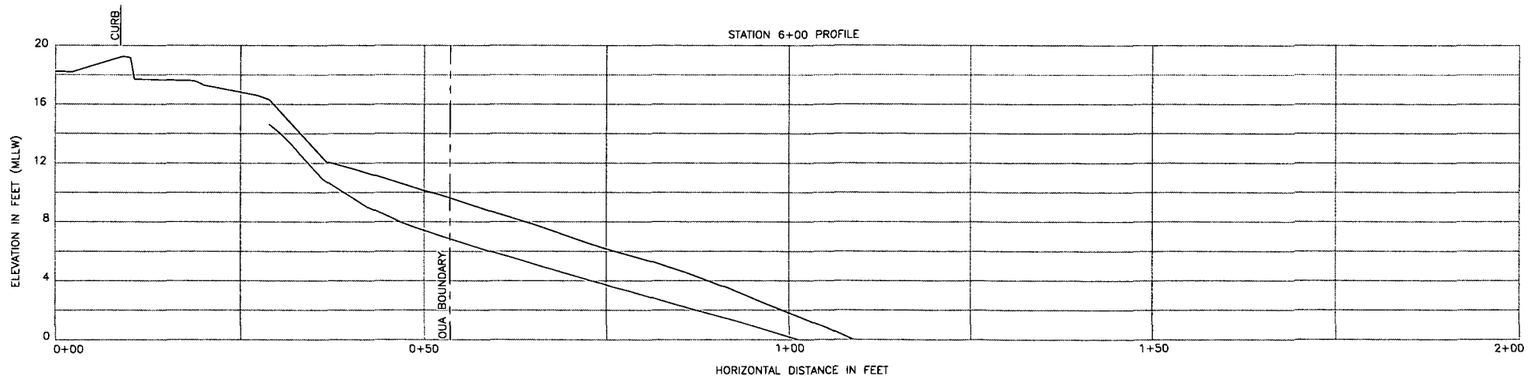


SECTION P/3



SECTION Q/3

NOTES:

1. TOPOGRAPHIC SURVEY CONDUCTED BY SES-TECH ON AUGUST 28, 2008.
2. SURFACE ELEVATION FOR APRIL 2002 BASED ON FINAL GRADING PLAN FOR MITIGATION ACTION (FWENC 2002).

LEGEND:

——— SURFACE ELEVATION AS OF APRIL 2002

——— SURFACE ELEVATION AS OF AUGUST 28, 2008

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

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NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
COMPARISON OF SURFACE ELEVATION

SES-TECH

DESIGNED: ELR		APPROVED	
DRAWN: AAS		SM	
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-REC	8/8

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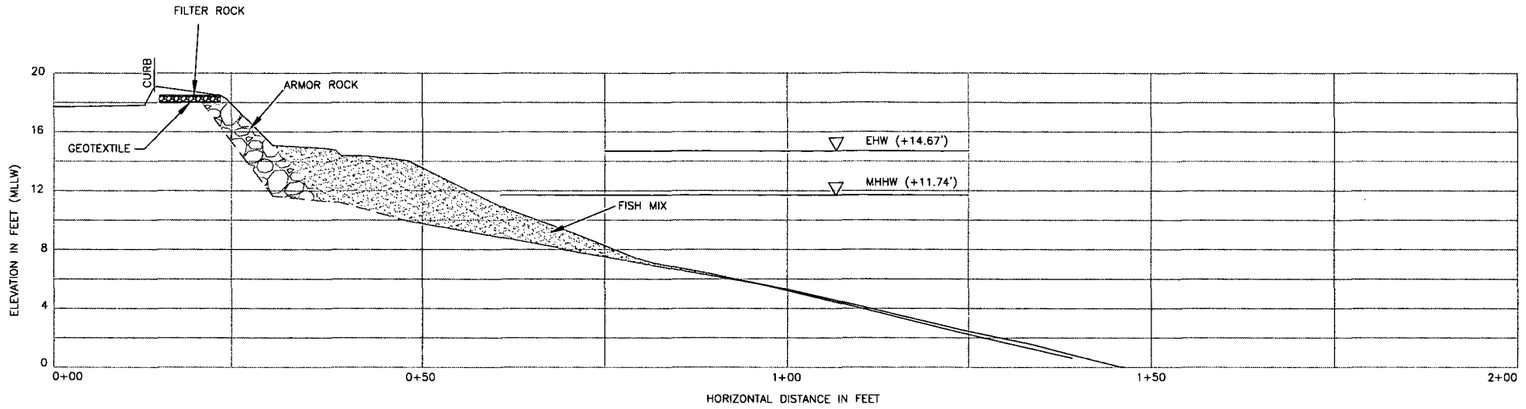

TYPICAL CROSS SECTION

NOTES:

1. TOPOGRAPHIC SURVEYS CONDUCTED BY SES-TECH ON SEPTEMBER 10, 2007 AND AUGUST 27-28, 2008.
2. GEOTEXTILE WAS PLACED OVER EXPOSED TOPSOIL SURFACE AND SECURED WITH FILTER ROCK.
3. EXISTING RIPRAP AND THE NEW ARMOR ROCK WAS TRANSITIONED BETWEEN STATION 3+20 AND 3+30.
4. ARMOR ROCK WAS PLACED ALONG SHORELINE APPROXIMATELY AT 1V:1.5H SLOPE. PLACEMENT THICKNESS VARIED BASED ON ACTUAL FIELD CONDITIONS.

LEGEND:

- REPRESENTATIVE SURFACE ELEVATION AS OF AUGUST 28, 2008
- SURFACE ELEVATION AS OF SEPTEMBER 10, 2007
- APPROXIMATE SURFACE ELEVATION AS OF AUGUST 19, 2008

5 0 5 10 20
HORIZONTAL SCALE

2.5 0 2.5 5 10
VERTICAL SCALE

VERTICAL DATUM: MLLW = 0.0 FEET
HORIZONTAL DATUM: NAD83/91
STATION ID: 9445958, BREMERTON, WA
TIDAL EPOCH: 1983-2001

RECORD DRAWING

DRAWING REDUCED HALFSIZE

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NAVAL FACILITIES ENGINEERING COMMAND NORTHWEST
SILVERDALE, WASHINGTON

BREMERTON NAVAL COMPLEX
BREMERTON, WASHINGTON

OUA CHARLESTON BEACH
POST CONSTRUCTION TYPICAL CROSS SECTION

SES-TECH

DESIGNED: ELR	APPROVED		
DRAWN: AAS	SM		
CHECKED: SO			
SIZE: D	SCALE: AS NOTED	DRAWING NO. 0031-XS-TYP	1/1

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SEATTLE, WA 98101

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File #:	11.6.2
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November 5, 2008
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Activity Name: Bremerton Naval Complex

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Document ID #:	*1306457*
File #:	11.6.2
Site Name:	PSNFF

Appendices D-Q

APPENDICES D - Q

(Provided on CD)